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# JOURNAL

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## ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV., PART ~~H.~~ ~~Extra Number~~, 1906.

*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. S. GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 16.

The present contribution commences with an account of the genus *Psychotria*, which concludes the Natural Order *Rubiaceæ*. In addition, it contains accounts of the Natural Orders *Valerianææ* and *Compositæ* (prepared by Sir G. King); *Stylidiææ*, *Goodenoviææ*, and *Campanulacææ* (prepared by Mr. Gamble); *Vacciniacææ* and *Ericacææ* (Sir G. King), *Epacrideææ* and *Plumbaginææ* (Mr. Gamble). For the new genera and species proposed in these Orders the authors are jointly responsible. The account of the Order *Monotropææ* has been supplied by Lieut.-Col. Prain, F.R.S., Superintendent of the Royal Botanic Garden, Calcutta; and that of the Order *Gentianææ* has been added, having been drawn up by Mr. C. B. Clarke, F.R.S., late President of the Linnean Society of London. It is somewhat out of its proper sequence, but has been included, as the descriptions were ready for publication.

In addition, therefore, to the account of the Rubiaceous genus *Psychotria*, with 29 Malayan Peninsular species, of which 11 are new to science, this fasciulus contains accounts of the Malayan members of 11 Natural Orders, including 48 genera and 81 species, of which 2 genera and 17 species are new to science.

Nat. Ord. LIX. RUBIACEÆ.

53. PSYCHOTRIA, Linn.

Shrubs or small trees, erect or occasionally climbing or twining rarely herbs. *Leaves* opposite, rarely in whorls of 3 or 4. *Stipules* free in pairs, or connate, often with glands or hairs, deciduous or persistent. *Flowers* rather small, in terminal, rarely axillary, cymes

corymbose or fascicles, bracteolate or not, never involucre (in the Malayan species). *Calyx-tube* short; the limb persistent in part or deciduous. *Corolla-tube* straight, short; the throat naked or hairy; the lobes of the mouth 5, rarely 4 to 6, valvate in bud. *Stamens* as many as the corolla-lobes, inserted on the throat or mouth; anthers linear or obtuse, attached dorsally near the base to short or long filaments. *Ovary* 2-celled; style long or short, bifid; ovules often cuneiform, solitary, erect from the base of each cell. *Fruit* small, baccate or drupe-like, ovoid globose or oblong, smooth or ridged, composed of two plano-convex, 1-celled, 1-seeded pyrenes; or didymous and separating into two cocci. *Seeds* plano-convex, the ventral surface grooved or plane, the dorsal smooth, ridged or sulcate; testa thin, albumen hard; embryo small, basal; cotyledons broad, thin; radicle inferior.—**DISTRIB.** Species about 550; tropical or sub-tropical.

**Scandent:—****Flowers 4-merous:—**

Panicles lax; leaves elliptic or oblong-lanceolate .. 1. *P. laxiflora*.

**Flowers 5-merous:—**

Seeds with 4 ridges on the dorsal surface, the ventral surface plane:—

Flowers sessile in small capitula at the ends of the branches of the cymes:—

Leaves ovate to oblong-elliptic, 1.75 to 2.5 in. broad; inflorescence puberulous .. 2. *P. morindaeflora*.

Leaves narrowly elliptic, less than 1.25 in. broad; inflorescence coarsely pubescent .. 3. *P. Maingayi*.

Flowers pedicellate in cymosely branched cymes:—

Leaves elliptic-oblancoelate to elliptic, the midrib sometimes pubescent on the lower surface, otherwise glabrous; main-nerves 7 to 10 pairs; petioles .4 to .75 in. long; fruit .25 in. long .. 4. *P. sarmentosa*.

Leaves narrowly elliptic-oblong, main-nerves 4 to 6 pairs; petioles .4 to .8 in. long; fruit .35 in. long .. 5. *P. Kunthii*.

Leaves broadly obovate or sub-ovate; main-nerves 5 to 10 pairs; petioles .5 to 1.5 in.; fruit .4 in. long .. 6. *P. penangensis*.

Seeds with 8 ridges on the dorsal surface, the ventral surface plane:—

Flowers pedicellate, in cymosely branched paniculate cymes; fruit narrowly ellipsoid .. 7. *P. Scortechinii*.

Flowers on short pedicels in globular cymes at the ends of the branches of the panicles:—

Leaves and stems glabrous; fruit subglobose, .2 in. long .. 8. *P. pilulifera*.

Leaves and stems and inflorescence rusty-pubescent .. 9. *P. ovoidea*.

Seeds with more than 4 ridges on both dorsal and ventral surfaces .. 10. *P. Ridleyi*.

## *Flora of the Malayan Peninsula.*

- Seeds faintly ridged on the dorsal surface, the ventral surface with a shallow groove . . . . . 11. *P. polycarpa*.
- Erect shrubs, usually small:—
- Flowers 4-merous:—
- Leaves with a strong pale intra-marginal nerve . . . . . 12. *P. calocarpa*.
- Flowers 5-merous:—
- Flowers shortly pedicellate, in dense globular cymes at the ends of the long-peduncled branches of a terminal umbellate cyme; leaves deciduously puberulous, with 9 to 18 pairs of main-nerves; fruit .3 in. long; seeds 4-ridged on the dorsal surface, slightly concave on the ventral . . . . . 13. *P. multicapitata*.
- Flowers sub-sessile, in short condensed dichotomous sessile axillary cymes; leaves with scurfy pubescence and 8 to 11 pairs of main-nerves; seeds 5-ridged on the dorsal and broadly grooved on the ventral surface . . . . . 14. *P. tortilis*.
- Flowers in a terminal umbellately branching cyme:—
- Seeds with a single dorsal ridge, the ventral surface plane:—
- Leaves quite glabrous:—
- Leaves 6 to 10 in. long; main-nerves 12 to 15 pairs . . . . . 15. *P. Griffithii*.
- Leaves usually under 6 in. long, main-nerves 8 to 10 pairs . . . . . 16. *P. angulata*.
- Leaves adpressed-pubescent, 6 to 12 in. long . . . . . 17. *P. Helferiana*.
- Seeds with a single dorsal ridge, the ventral surface with a groove; leaves 5 to 8 in long, quite glabrous, main-nerves 7 to 8, rarely 10 pairs . . . . . 18. *P. montana*.
- Seeds with 5 ridges on the dorsal surface, the ventral surface plane:—
- Leaves glabrous:—
- Leaves oblong-elliptic to oblanceolate-elliptic, 3.5 to 8 in. long; fruit .25 in. long . . . . . 19. *P. viridiflora*.
- Leaves softly pubescent:—
- Leaves elliptic to elliptic-oblong, the bases cuneate rounded or cordate, 3.5 to 5 in. long; fruit .25 to .3 in. long . . . . . 20. *P. Birthana*.
- Leaves elliptic, the upper surface glabrous except the midrib, 5 to 7 in. long; fruit .45 in. long . . . . . 21. *P. fulva*.
- Seeds 5-ridged on the dorsal surface and 2-grooved on the ventral; leaves glabrous on the upper surface, their margins crenulate . . . . . 22. *P. fulvoidea*.
- Seeds with 5 ridges on the dorsal surface and 1 ridge on the ventral; leaves glabrous, usually oblanceolate . . . . . 23. *P. stipulacea*.
- Seeds 4-ridged on the dorsal surface, plane on the ventral:—
- Leaves elliptic, tapering equally to each end, 9- to 10-nerved; calyx-lobes very long caudate-acuminate . . . . . 24. *P. Curtisi*.
- Leaves obovate-oblong or obovate-oblanceolate, 10- to 14-nerved; calyx-lobes short, broad, blunt . . . . . 25. *P. rhinocerotis*.



## *Flora of the Malay Peninsula*

Seeds with 4 ridges on the dorsal surface and a faint groove on the ventral; leaves elliptic or elliptic-lanceolate, 12- to 18-nerved. . . . . 26. *P. malayana*.

### SPECIES IMPERFECTLY KNOWN.

*Psychotria Wrayi*, No. 27.  
*inequalis*, No. 28.  
*condensa*, No. 29.

1. *PSYCHOTRIA LAXIFLORA*, Blume Bijdr. 964. Scandent or epiphytic, glabrous except the inflorescence; young branches slightly thicker than a crow-quill, terete, dark-coloured, brown, shining. *Leaves* membranous, narrowly elliptic or oblong-lanceolate, much acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the lower the paler, midrib distinct; main-nerves 4 to 6 pairs, faint, curved, ascending; length 2 to 4 in.; breadth .5 to 1 in.; petiole .15 to .2 in. long. *Stipules* forming a tube from .15 to 3 in. long, sharply toothed. *Panicles* solitary, terminal, lax, more than half as long as the leaves, on naked peduncles about 1 in. long; branches cymose, with small acute bracteoles at their bases, puberulous. *Flowers* .15 to .2 in. long, puberulous, in cymes of three at the ends of the branchlets; their pedicels short, with broad acute caducous bracteoles at their bases. *Calyx* shortly funnel-shaped, the mouth sub-truncate or obscurely 4-toothed. *Corolla* longer than the calyx, broadly clavate in bud, funnel-shaped; the mouth with 4 broad obtuse lobes, throat sericeous. *Anthers* 4, elliptic, blunt, sub-sessile. *Fruit* clavate-ellipsoid, with 8 vertical ridges (2 of them double), glabrous; seeds with 4 bold ridges on the dorsal surface; the ventral surface quite flat. Miq. Fl. Ind. Bat. II. 187.

SINGAPORE: *Ridley* 13, 4828. JOHORE: *Ridley*. PERAK: *King's Collector* 4117, 8428; *Wray* 110.—DISTRIB. Sumatra, *Forbes* 1297, 1309, 1710, 2466, Java, *Koorders* 23550b.

2. *PSYCHOTRIA MORINDÆFLORA*, Wall. Cat. 8438 A.B.C. in part. A woody climber, 15 to 20 feet long, glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, dark brown when dry, terete, somewhat thickened at the nodes, the internodes minutely lenticellate and faintly striate. *Leaves* coriaceous, ovate to elliptic, sometimes oblong-lanceolate, shortly and rather bluntly acuminate, the base slightly cuneate or rarely rounded; upper surface olivaceous-greenish when dry, the lower purplish-brown; the midrib channelled on the upper surface, prominent on the lower; main-nerves 6 to 8 pairs, rather straight, spreading, thin but rather distinct on both surfaces when dry, length 3 to 4.5 in.; breadth 1.75 to 2.5 in.; petiole

·2 to ·5 in. *Stipules* caducous, leaving a pale narrow scar between the petioles. *Cymes* terminal, about 2 in., rarely 3 in. long; the branches compressed and angled, scurfy-puberulous, two of them springing from the base, the other three umbellate at the apex of the main axis, each bearing at its apex a dense, many-flowered, minutely bracteolate capitulum less than ·5 in. in diam. *Flowers* ·2 in. long, sessile. *Calyx* cupular, the mouth with 5 small blunt teeth. *Corolla* twice as long as the calyx; the mouth with 5 deep oblong blunt lobes; throat densely sericeous. *Anthers* 5, short, elliptic, basifixed on stout filaments. *Style* cylindric, thickened upwards, stigma of 2 broad lobes. *Fruit* short, compressed ovoid-elliptic, with 8 vertical ridges (2 of them double) crowned by the small calyx, 25 in long and 15 in. in diam. from front to back; seeds with 4 dorsal ridges; ventral surface plane. Hook. fil. Fl. Br. Ind. III. 166 *Psychotria*? Wall. Cat. 8355.

PERAK: *King's Collector* 2585, 2665; *Scortechini* 1826, *Wray* 4001. PENANG: *Wallich*; *Curtis* 478.

3. *PSYCHOTRIA MAINGAYI*, Hook. fil. Fl Br Ind. III 166. A slender woody climber; young branches half as thick as a goose-quill, pubescent, ultimately pale and glabrous. *Leaves* thickly membranous, narrowly elliptic, caudate-acuminate, the base much narrowed; both surfaces glabrous, when dry pale olivaceous, the upper rather the darker; main-nerves about 6 pairs, indistinct on both surfaces like the midrib; length 2 to 3·25 in.; breadth ·65 to 1·2 in.; petiole ·1 to ·2 in, slender. *Stipules* cartilaginous, persistent, connate into a tube ·15 in. long with a few hairs at the truncate and toothed or acute apex. *Cymes* axillary, on slender, compressed, coarsely pubescent peduncles shorter than the leaves, few-branched. *Flowers* sessile, bracteoles linear. *Calyx* much longer than the pubescent ovary, widely campanulate; the lobes ovate-triangular, caudate-acuminate, spreading. *Corolla* unknown. *Fruit* broadly ellipsoid, with 8 deep vertical grooves, pale, nearly glabrous when ripe, ·2 in. long

SINGAPORE: *Maingay* (K.D) 926; *Ridley* 6924.

4. *PSYCHOTRIA SARMENTOSA*, Blume Bijdr 964 Scandent; woody, young stems thinner than a goose-quill, pale, glabrous. *Leaves* thinly coriaceous, elliptic-oblancheolate to elliptic, acute or shortly and abruptly acuminate, much narrowed at the base, edges slightly recurved; both surfaces pale brown tinged with olivaceous when dry, minutely reticulate; the upper glabrous, the lower sometimes pubescent only on the stout midrib; main-nerves 7 to 10 pairs, curving slightly upwards, faint; length 2·5 to 4 in.; breadth 1 to 1·75 in., petioles ·4 to ·75 in., winged above. *Stipules* broad at the base, the apex caudate-acuminate.

*Cymes* terminal, puberulous, shorter than the leaves, on short peduncles, cymosely branched; the branches angled, spreading, many-flowered; bracteoles minute, linear. *Flowers* about 15 in. long, puberulous outside, on short pedicels. *Calyx* campanulate, with 5 short triangular teeth. *Corolla* villous at the base in the interior. *Fruit* ellipsoid, .25 in. long, with 10 vertical ridges (2 of them double). *Seeds* with 4 dorsal ridges, the ventral surface plane. DC. Prod. IV. 522; Wight. Ic. 1038; Thwaites Enum. Pl. Ceyl. 148; Kurz For. Fl. Burm. II. 14; Hook. fil. Fl. Br. Ind. III. 165. *P. obovata*, Wall. Cat. 8380. *Grumilea Junghuhniana*, Miq. Fl. Ind. Bat. II. 296. *Psychotria* sp., Wall. Cat. 8382, 8352 ?, 8384.

SINGAPORE: Ridley 2874, 2875, 9112. MALACCA: Griffith (K.D.) 3043. PERAK: King's Collector 4967, 7572. PENANG: King 1346; Curtis 951, 2781.—DISTRIB. Burma, Wallich; Helfer (K.D.) 3041, &c.; Indian Peninsula; Ceylon; Malay Archipelago; Andaman Islands.

VAR. *pachyphylla*, King & Gamble. *Leaves* thickly coriaceous, shining, greenish when dry, 3 to 4 in. long; fruit .25 in. long, sub-globular.

PENANG: Ridley 9363; Curtis 2215.

5. *PSYCHOTRIA KUNSTLERI*, n. sp., King & Gamble. A glabrous epiphyte with slightly angled stems thinner than a goose-quill, pale yellowish when dry. *Leaves* succulent, glossy and bluish-green when fresh, but yellow on both surfaces and dull when dry, narrowly elliptic-oblong, rarely oblong-oblancheolate, gradually and equally tapering to each end, the midrib bold, channelled on the upper surface; main-nerves 4 to 6 pairs, spreading, very indistinct; length 3 to 5.5 in.; breadth .8 to 1.4 in.; petioles .4 to .8 in. long. *Stipules* forming a cartilaginous persistent cup with an entire mouth, about .1 in. long. *Cyme* solitary, umbellate, terminal, longer than the leaves (the naked peduncle of 2 to 3 in. being included), lax, from 2 to 4 in. broad; branches spreading, dividing near their apices into umbellate cymes; bracteoles few, linear, acute. *Flowers* not seen: on basally bracteolate pedicels as long as themselves. *Fruit* .35 in. long, ellipsoid, deeply 10-grooved, crowned by the rather large remains of the 5-toothed calyx, 10-ridged. *Seeds* dorsally 4-ridged, the ventral surface flat.

PERAK. *Scortechini*; King's Collector 1886, 4953, 6588; Wray 2230.—DISTRIB. Sumatra, Forbes 2823.

6. *PSYCHOTRIA PENANGENSIS*, Hook. fil. Fl. Br. Ind. III. 175. A shrubby epiphyte or climber, 8 to 12 feet long, all parts except the inflorescence glabrous; young branches slightly compressed, thinner than a goose-quill, dark-coloured. *Leaves* thinly coriaceous, broadly elliptic-obovate or sub-ovate, shortly and abruptly triangular, acuminate.

nate, much narrowed at the base into the broad petiole; both surfaces brown when dry, the upper slightly olivaceous; the midrib broad, channelled on the upper surface, main-nerves 5 to 10 pairs, spreading, thin, distinct on the lower surface; length 3 to 4.5 in.; breadth 1.5 to 2.5 in.; petiole .5 to 1.5 in. long, slightly winged above. *Stipules* broadly ovate, sub-acute or blunt, sub-tubular, sometimes bifid, .2 to .4 in. long. *Cymes* umbellate, solitary or terminal, pedunculate, as long as or longer than the leaves (including the compressed naked 1 to 2 in. long peduncle); primary branches long, spreading; the ultimate umbels with broad-based subulate unequal bracteoles. *Flowers* .2 to .25 in. long, sessile or on short pedicels; bracts .25 in. long. *Calyx-tube* obconic, its teeth triangular. *Corolla* longer than the calyx, shortly and widely tubular, deeply divided into 5 broad lobes thickened near the apex, the apex itself sharp and inflexed, glabrous inside except for the ring of hair in the throat at the insertion of the short filaments. *Anthers* elliptic, blunt, entire. *Fruit* ellipsoid, compressed, with 10 obtuse vertical ridges (2 of them double), glabrescent, crowned by the rather large calyx; length .4 in., breadth .25 in. *Seeds* 2, plano-convex, the dorsal surface with 4 blunt ridges, the ventral surface plane.

MALACCA: *Mangay* (K.D) 920. SINGAPORE: *Ridley* 2870. PERAK. *Scortechini* 2034; *King's Collector* 3049, 4591, 10723. SELANGOR *Ridley* 7425. PANGKORE: *Curtis* 1621.

7. *PSYCHOTRIA SCORTECHINII*, n sp., King & Gamble. A climber, all parts glabrous; young branches pale brown, thicker than a crow-quill, terete, smooth. *Leaves* membranous, ovate-lanceolate or narrowly elliptic, acuminate, the base narrowed or rarely rounded; both surfaces brown when dry (the lower slightly paler), the midrib prominent, main-nerves 5 or 6 pairs, curved, spreading, not prominent; length 2.5 to 4 in.; breadth 1 to 1.5 in.; petiole .15 to .2 in. *Stipules* oblong, acute, connate at their bases, .15 to .2 in. long, caducous. *Cymes* paniculate, solitary, terminal, rarely axillary, spreading, lax, cymosely branched, in flower as long as or nearly as long as the leaves, in fruit longer, the branches bracteolate, angled, divaricating. *Flowers* on the ultimate branchlets in threes, .15 in. long, on short pedicels, each with a bracteole at the base. *Calyx* cupular, with 5 short acute teeth. *Corolla* longer than the calyx, cylindric, with short triangular lobes, the throat with tufts of yellowish hairs between the 5 stamens. *Anthers* on short filaments. *Style* cylindric, stigma 2-lobed. *Fruit* narrowly ellipsoid, tapering to each end, sometimes clavate, slightly compressed, 8-ridged (2 being double), crowned by the calyx, .35 in. long and .2 in. in diam. *Seeds* with 3 broad dorsal ridges, ventral surface plane.

PERAK: *Scortechini* 311, 404, 426; *King's Collector* 897, 2566, 5373.

This closely resembles *P. laxiflora*, Bl., but has 5-merous flowers and longer, less clavate fruit.

8. *PSYCHOTRIA PILULIFERA*, n. sp., King & Gamble. A small tree or climber; all parts except the inflorescence glabrous; young branches about as thick as a crow-quill, terete, pale brown when dry. *Leaves* coriaceous, narrowly elliptic, much tapered to both ends; both surfaces olivaceous when dry, the lower slightly the paler; main-nerves 6 or 7 pairs, inconspicuous, the midrib bold beneath when dry; length 2·5 to 3·5 in.; breadth ·75 to 1 in.; petiole ·35 to ·4 in. long, slender. *Inflorescence* a terminal, few-branched, puberulous panicle of condensed 8-10-flowered globular cymes. *Flowers* and their short pedicels minutely tomentose. *Calyx* shortly campanulate, the mouth with 5 spreading triangular acute lobes. *Corolla* tubular; the lobes oblong, broad, with small inflexed apices. *Anthers* 5, attached to the throat by short filaments surrounded by coarse hair. *Fruit* sub-globose, with 10 bold vertical ridges (2 of them double), crowned by the small calyx, ·2 long and ·15 in. in diam. *Seeds* with 3 bold ridges on the dorsal surface; ventral surface plane.

PERAK, at elevations of 3,000 to 5,000 feet: *Wray* 287, 398, 434, 946, 3870.

9. *PSYCHOTRIA OVOIDEA*, Wall. Cat. 8383. A slender woody climber, 20 to 40 feet long; stems thinner than a goose-quill, densely rusty-pubescent. *Leaves* with recurved margins, coriaceous, ovate- or elliptic-lanceolate, shortly acuminate, the base cuneate or rounded, sometimes minutely cordate; upper surface olivaceous when dry, glabrous, the main-nerves depressed; the lower brown, pubescent on the stout midrib and 5 to 7 pairs of prominent curved ascending main-nerves, puberulous on the interspaces; length 1·5 to 2·5 in.; breadth ·85 to 1·25 in.; petioles ·15 to ·25 in. long. *Stipules* connate, ovate-lanceolate, ·25 in. long, caducous. *Cymes* ·75 to 2 in. in diam., trichotomous, solitary, terminal, rusty-pubescent, on angled peduncles ·5 to 1 in. long. *Flowers* about ·15 in. long, on short pedicels, crowded in dense cymes at the ends of the branches and mixed with linear bracteoles. *Calyx* campanulate, with 5 spreading acute teeth. *Corolla* twice as long as the calyx, salver-shaped, with 5 lobes, the tube villous inside. *Fruit* ovoid-globose, ·15 in. long, the apex crowned by the calyx, the sides with 6 faint vertical ridges. *Seeds* faintly 3-ridged on the dorsal surface; the ventral surface broad, flat. Hook. fil. Fl. Br. Ind. III. 166.

SINGAPORE: *Wallich*, *Seeman* 2348. MALACCA: *Maingay* (K.D.) 923; *Ridley* 97, 8407.

10. *PSYCHOTRIA RIDLEYI*, n. sp., King & Gamble. A small shrub; all parts glabrous except the inflorescence; stems half as thick as a goose-quill, terete, greenish when dry. *Leaves* membranous, oblong-to elliptic-oblancheolate, the apex abruptly and very shortly acuminate, the base much narrowed, both surfaces pale olivaceous when dry, the midrib rather prominent, the upper sometimes with scattered minute, adpressed white hairs; main-nerves 7 to 9 pairs, slightly curved, spreading, faint on both surfaces; length 3 to 5.5 in., breadth 1.25 to 2.25 in.; petioles .4 to .8 in. long, winged near the apex. *Stipules* broadly ovate, subacute, .1 in. long. *Cyme* on a peduncle about 1 in. long (longer in fruit), corymbosely branched, the bracts at the forks linear-lanceolate. *Flowers* in cymules of three, everywhere canescent, on short pedicels bibracteolate at the base. *Calyx* campanulate with elongated tube, the mouth with 5 erect ovate-triangular lobes. *Corolla* longer than the calyx; the tube short, slightly villous at the base near the insertion of the broad sub-sessile anthers; the 5 lobes broadly ovate, acute. *Fruit* ovoid-ellipsoid, 12-ridged, crowned by the small calyx, .3 to .4 in. long. *Seeds* many-ridged on both dorsal and ventral surfaces.

SINGAPORE. *Ridley* 48, 10818. JOHORE: *Ridley* 6472. MALACCA on Mt. Ophir, *Hullett* 811; *Goodenough* 1363.

11. *PSYCHOTRIA POLYCARPA*, Hook. fil. Fl. Br. Ind. III. 165 A climber, glabrous except the inflorescence; young branches thinner than a goose-quill, terete, when dry dark-coloured. *Leaves* coriaceous, ovate- or obovate-lanceolate to obovate- or ovate rotund, the apex in the narrower forms shortly and bluntly acuminate, in the broader abruptly and bluntly apiculate; both surfaces olivaceous when dry, the upper somewhat shining, the lower dull and darker, the midrib prominent on both; main-nerves 5 or 6 pairs, spreading, faint on both surfaces; length 2 to 3 in.; breadth .75 to 1.75 in.; petioles .3 to .6 in. *Stipules* very short, connate to form a collar, caducous. *Panicles* large, umbellately cymose, longer than the leaves (sometimes very much so), their branches numerous, spreading, puberulous, with minute bracteoles at the divisions. *Flowers* .15 in. long, numerous, in ultimate cymules of 2 or 3, shortly pedicellate. *Calyx* thick, minutely pubescent, shortly campanulate or sub-cupular, the mouth with 5 acute teeth or subentire. *Corolla* longer than the calyx, salver-shaped, its 5 lobes spreading, lanceolate, acute, the throat sericeous, anthers 5, elliptic. *Fruit* ellipsoid, tapered to the base, and the apex crowned by the rather large remains of the calyx; obscurely ridged; .15 in. long and .1 in. in diam., sometimes sub-globular, the epicarp somewhat pulpy. *Seeds* slightly convex and faintly ridged on the dorsal surface, the ventral with a broad

shallow groove. *P. obovata*, Wall. Cat. 8380A. *Grumilea polycarpa*, Miq. Fl. Ind. Bat. II. 295.

SINGAPORE: Ridley 2029. MALACCA: Griffith (K.D.) 3042; Main-  
gay (K.D.) 924; Hullett 402. JOHORE: Ridley 4090, 11160. PENANG:  
Curtis 1095. PERAK: Wray and King's Collector many numbers.  
DISTRIB.—JAVA, King; Forbes 1061; Koorders 28043b.

12. *PSYCHOTRIA CALOCARPA*, Kurz in Journ. As. Soc. Beng., 1872, II. 315. A glabrous shrub 2 to 4 feet high; young branches thinner than a goose-quill, dark-coloured when dry. Leaves thickly membranous, oblong-oblancoelate or oblanceolate, shortly caudate-acuminate at the apex, much attenuate at the base, the edges sometimes broadly crenate; both surfaces olivaceous when dry, the midrib and nerves broad, distinct and pale; main-nerves 10 to 12 pairs, slightly curved, spreading and interarching to form a bold pale intramarginal nerve 1 to 1.5 in. from the edge; length 5 to 8 in.; breadth 1.65 to 2.5 in.; petiole .75 to 1.25 in., slightly winged near the apex. Stipules broadly triangular, acuminate, membranous, sometimes bifid, 2 in. long. Cymes terminal or axillary, sessile or shortly pedunculate, shorter than the petioles, about 1.25 in. across and .5 in. long, branched from near the base, the branches compressed, trichotomous; the bracteoles lanceolate, acuminate. Flowers .2 in. long, on short pedicels. Calyx with a short cylindric tube and 4 longer oblong blunt sub-erect concave lobes. Corolla exceeding the calyx, narrowly campanulate, bluntly 4-lobed, the throat densely sericeous, otherwise glabrous. Fruit sub-globose or ovoid, sub-compressed; the epicarp fleshy, glabrous, rugulose when dry; .3 in. in breadth and rather less in length, the persistent calyx-lobes small. Seeds large, the dorsal surface faintly 1-ridged, the ventral deeply grooved. Kurz For. Fl. Burm. II. 9; Hook. fil. Fl. Br. Ind. III. 173. *P. asiatica*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 160; Wall. Cat. 8331: not of Linn. nor of Roxb. *P. viridiflora*, Reinw. var. *undulata*, Kurz For. Fl. Burm. II. 13. *P. picta*, Wall. Cat. 8353; and *Psychotria*, l.c. 8359.

PERAK: Ridley 7199; Wray 2200; King's Collector 1930, 2348, 6798, 10772. Scortechini. MALACCA: Hervey.—DISTRIB. Himalaya, Assam, Burma.

This plant is very common in the lower Himalaya, Assam, and Burma. In the Flora of British India it is described as herbaceous, but the Malayan specimens are all woody. The leaves are always readily distinguished, when dry, by the pale broad main-nerves and by the very conspicuous intra-marginal nerve. In Malaya the plant is glabrous, but in the Indian specimens the under surfaces of the leaves are deciduously puberulous.

13. *PSYCHOTRIA MULTICAPITATA*, n. sp. King & Gamble. An erect

much-branched shrub 3 to 7 feet high, young branches thinner than a goose-quill, slightly compressed, swollen at the nodes, pale, deciduously puberulous. *Leaves* thinly membranous, greenish when dry, broadly obovate-lanceolate, oblong or elliptic, abruptly and shortly caudate-acuminate, the base narrowed to the rather short petiole, upper surface quite glabrous; the lower scurfy-puberulous on the broad midrib and 9 to 13 pairs of curved spreading main-nerves, length 5 to 10 in., breadth 2.5 to 4 in., petiole .75 to 1.15 in. *Stipules* free, broadly triangular, 1.5 in long. *Cymes* terminal, solitary, peduncled, about 2 in long (including the peduncle) and the same in breadth, umbellately branched from near the base, the ultimate branches numerous, bearing terminal many flowered globular minutely bracteolate cymules, about .5 in in diam, the common peduncle about an inch or more long, the branches shorter, all puberulous. *Flowers* on short puberulous pedicels, ovoid in bud, about .15 in long when expanded. *Calyx* cupular, with 5 or 6 triangular acute sub-erect teeth. *Corolla* longer than the calyx, the tube cylindric and, like the throat, densely white-sericeous inside, lobes of the limb short, triangular, deflexed. *Anthers* bifid at the base. *Style* thick, bifid, longer than the corolla. *Fruit* ellipsoid obovoid, 10-ridged, crowned by the small calyx, glabrous, .3 in long. *Seed* dorsally with 4 faint ridges, ventrally somewhat concave.

PERAK *Scortechium* 214, 291, *King's Collector* 436, 867, 2862, 5402, 7380, 7513, 10559

14 *PSCHYOTRIA TORTILIS*, Blume Bijdr 958. Stem woody below, erect, 6 to 18 in high, not branched, cinereous, 4-angled, sparsely covered with short coarse scurfy hairs. *Leaves* membranous, broadly elliptic or ovate-elliptic, the apex acute or subacute, narrowed from below the middle to the petiole, upper surface when dry dark green, the lower pale, glaucous, minutely lepidote, the 8 to 11 pairs of slightly curved spreading main-nerves covered with minute short coarse deciduous dark-coloured hairs, length 4 to 6 in., breadth 1.75 to 3 in., petioles .5 to 2 in., compressed, scurfy pubescent. *Stipules* broadly triangular, much acuminate, bifid, 1.5 to 3 in long. *Cymes* solitary sessile, axillary, dichotomous, many-flowered, condensed, .5 in to 1 in long and as much broad. *Flowers* .15 in long, on short ebracteolate pedicels. *Calyx* campanulate, with 5 triangular spreading teeth, covered with coarse hair. *Corolla* longer than the calyx, narrowly campanulate, with 5 ovate acute lobes, hairy like the calyx. *Anthers* 5, sessile, oblong, blunt, included. *Style* shorter than the calyx, stigmas short, linear, divergent. *Fruit* crowned by the small calyx-lobes, reniform, pale with numerous short vertical brown streaks, and stiff short white hairs, 1 in broad and less in length, the dorsal surface of each of the two,



cartilaginous cocci with 3 bold ridges. *Seeds* bluntly 5-ridged on the dorsal, broadly grooved on the ventral surface. DC. Prod. IV. 520; Hook. fil. Fl. Br. Ind. III. 169. *P. microcarpa*, Wall. Cat. 8344. *Streblota tortilis*, Korth. Kruidk. Arch. II. 246.

PENANG: Wallich 8344; Curtis 405, 1269. SINGAPORE: Lobb. PERAK: King's Collector 710, 2627; Scortechini.—DISTRIB. Sumatra, Forbes 1495.

15. *PSYCHOTRIA GRIFFITHII*, Hook. fil. Fl. Br. Ind. III. 171. A shrub; glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, terete, of a dark colour when dry. *Leaves* coriaceous, oblong or elliptic, shortly and somewhat abruptly acuminate, the base cuneate, the edges slightly recurved and pale, both surfaces drying olivaceous-green, shining, the midrib and the 12 to 15 pairs of curved spreading main-nerves distinct; length 6 to 10 in.; breadth 1·75 to 3·5 in.; petiole ·4 to ·8 in., slightly winged above, stout. *Stipules* broadly triangular, sub-acute, ·2 to ·3 in. long. *Cymes* terminal, solitary, pyramidal, about 1·5 in. long and the same in breadth, on naked compressed peduncles 1·5 in. or more long (lengthening to 2 in. or more in fruit); branches short, stout, puberulous, ebracteolate; the ultimate ones bearing the shortly pedicelled flowers in cymes of three. *Flowers* 2 in. long. *Calyx* campanulate, with 5 broadly triangular acute sub-erect teeth. *Corolla* as long as the calyx, fleshy, tubular, with 5 broad oblong hooded lobes; the tube finely sericeous inside, otherwise glabrous. *Anthers* 5, broadly oblong, entire, dorsifixed; the filaments thin, compressed, broad. *Style* short, with 2 broad flat lobes. *Fruit* elliptic, slightly obovoid, the apex subtruncate, crowned by the remains of the disk and calyx, glabrous, black when dry, ·4 in. long and ·35 in. broad; with 4 broad vertical ridges, two of them grooved externally and consisting of two ridges united, the other two single; 2-celled, and 2-seeded. *Seeds* large, the dorsal surface with a single ridge, the ventral flat, not grooved, everywhere smooth.

MALACCA: Griffith (K.D.) 3044; Maingay (K.D.) 918; Harvey; Derry 367. PERAK: Ridley 2873. SINGAPORE: Ridley 2872, 2873, 6314, 6468, 6556; Hullett 848.

16. *PSYCHOTRIA ANGULATA*, Korth. in Ned. Kruidk. Arch. II. 243. A shrub 4 to 6 ft. high, glabrous except the inflorescence; young branches pale brown when dry, thinner than a goose-quill, terete. *Leaves* coriaceous, oblanceolate to oblanceolate-elliptic, the apex shortly and rather abruptly acuminate, the base much narrowed; both surfaces brown when dry, tinged with olivaceous; the upper very shining, the broad midrib and nerves depressed; the lower less shining, the midrib

very prominent, and the 8 to 10 pairs of spreading nerves thin but distinct; length 4 to 6 in.; breadth 1 to 1.75 in.; petiole .2 to .5 in., slightly winged near the apex. *Stipules* broadly triangular, acute, sub-acute or bifid, .25 in. long. *Cyme* solitary, terminal, pyramidal, about 1.5 in. long, on a naked peduncle 1.25 to 3 in. long, branches whorled, shortly bracteolate at their bases, spreading; the ultimate branchlets crowded at their ends with numerous sessile flowers .25 in. long. *Calyx* pale, widely cupular, .05 in. long, with irregular small teeth. *Corolla* thick, tubular, its 5 broad lobes with acute inflexed apices; the throat densely sericeous. *Anthers* elliptic, blunt, on short filaments. *Fruit* ovoid or narrowly obovoid, pulpy, obscurely ridged, glabrous, crowned by the small calyx, 5 in. long and half as much broad (unripe), 2-celled. *Seeds* 2, plano-convex. Miq. in Ann. Mus. Lugd. Bat. IV. 210; Hook. fil. Fl. Br. Ind. III. 172. *Psychotria*, Wall. Cat 8348 *Chasalia perforata*, Miq. Fl. Ind. Bat. Suppl. 546.

MALACCA: Griffith (K.D.) 9037. PROVINCE WELLESLEY: Ridley 7026 JOHORE: Ridley 11161. SINGAPORE: Ridley 2867. PAHANG: Ridley 1353. PENANG: Curtis 14, 726; King's Collector 1683. PERAK King's Collector 4170.—DISTRIB. Burma.

17. *PSYCHOTRIA HELFERIANA*, Kurz in Journ. As. Soc. Beng., 1872, II. 314. A shrub; the whole plant more or less rusty-pubescent, young branches as thick as a goose-quill or thicker, the pubescence dense and deciduous. *Leaves* thickly membranous, elliptic or oblong-elliptic, rarely obovate-elliptic, the apex acuminate, the base usually cuneate but sometimes rounded; both surfaces dark brown when dry, the lower somewhat tinged with red and less hairy than the upper, the hairs on both adpressed and very numerous on the stout midrib, less so on the 9 to 16 pairs of spreading curved main-nerves; length 6 to 12 in.; breadth 2.5 to 4.5 in., petioles 1 to 1.75 in. *Stipules* broadly ovate to oblong-lanceolate, often as much as 1 in. long, the apex acuminate bifid. *Flowers* .2 in. long, numerous, mixed with many unequal bracteoles mostly longer than themselves, all acuminate and some of them bifid and crowded in dense pedunculate capitula in a few-branched axillary cyme usually shorter than the leaf-petioles. *Calyx*-tube narrowly campanulate, with 5 lanceolate erect lobes nearly as long as itself, everywhere pilose. *Corolla* similar to the calyx, but smaller and less hairy. *Stamens* almost sessile; anthers broad, blunt. *Fruit* ovoid or ellipsoid, somewhat compressed and boldly 8-ridged, crowned by the lobes of the calyx, .3 in. long and .2 in. in diam. Kurz For. Fl. Burm. II. 11; Hook. fil. Fl. Br. Ind. III. 172.

SINGAPORE: Wallich 8368; Goodenough 184; Maingay (K.D.) 921 MALACCA: Maingay (K.D.) 921; Ridley 184; Lobb. JOHORE: Ridley

11159; *King*; *Hullett* 507. PERAK: *King's Collector* 4845, 4661.  
—DISTRIB. Burma.

VAR. *diffusa*, *King* & *Gamble*. Capitula in spreading pedunculate panicles several inches in diam.

PERAK: *Scortechini* 400. JOHORE: *Ridley* 3732. SINGAPORE: *Hullett*.

VAR. *angustifolia*, *King* & *Gamble*. Leaves elliptic-oblong or oblong, not more than 2 in. in width; capitulum solitary, sessile.

SINGAPORE: *King*.—DISTRIB. Andamans.

VAR. *glabra*, *King* & *Gamble*. Leaves glabrous.

PERAK: *Wray* 1963.

18. PSYCHOTRIA MONTANA, Blume Bijdr. 960. A stout glabrous shrub; young branches half as thick as a goose-quill, angled, brown when dry. Leaves thinly membranous, on rather long petioles, elliptic or elliptic-oblong, acuminate, the base cuneate; both surfaces greenish or olivaceous-brown when dry, the lower the paler; main-nerves 7 to 8 pairs (rarely 10 pairs) curving upwards, pale and bold like the midrib on the lower surface, faint on the upper; length 5 to 8 in.; breadth 1.75 to 3.5 in.; petioles .4 to 1.25 in., winged near the apex. Stipules connate by their short broad bases, the apices caudate-acuminate, curved. Cymes terminal, paniculate, on angled peduncles .5 to 1.25 in. in length; branches spreading, angled, bearing numerous shortly pedicelled flowers in cymes of three. Flowers .25 in. long. Calyx cupular with 5 broad spreading triangular teeth. Corolla with sub-campanulate tube having a broad band of hairs inside in the upper half; the lobes of the mouth 5, broad, acute, reflexed. Fruit ellipsoid-ovoid to ellipsoid, boldly 4-ridged, glabrous, .25 to .3 in. long. Seeds: the dorsal surface with a single ridge, the ventral deeply concave, grooved. DC. Prod. IV. 521; Hook. fil. Fl. Br. Ind. III. 174. *P. viridissima*, Kurz in Journ. As. Soc. Beng. 1872, II. 315; For. Fl. Burm. II. 13. *Chasala montana*, Miq. Fl. Ind. Bat. II. 281. *C. expansa*, var. *montana*, Miq. MS. *Psychotria*, Wall. Cat. 8371, 8378, and *Rubiaceæ*, 8339. *Coffea tabaccifolia*, Wall. Cat. 8334.

PERAK: *Scortechini*; *Ridley*, 2922; *King's Collector*, 452, 2190; *Wray* 276. —DISTRIB. Sumatra, *Forbes* 1566, 1862, 2201, 2241, 2330. JAVA: *Bl* *Forbes* 271, 759, &c. Burma; Assam; Sylhet (*Griffith*, K.D.) 8047.

VAR. *brevipetiolata*, *King* & *Gamble*. Leaves with petioles .2 to .4 in. long.

PERAK: *Scortechini* 277, 1513; *Wray* 1628, 2289; *King's Collector* 389, 922, 1914, 2190, 4707, 6111, 8596. SELANGOR: *Ridley* 10583. PAHANG: *Ridley* 5831. MALACCA: on Mt. Ophir, *Hullett* 762

19: *PSYCHOTRIA VIRIDIFLORA*, Reinw. ex Blume Bijdr 965 A small tree or a bush, all parts, except the inflorescence, glabrous, young branches thinner than a goose-quill, dark brown. *Leaves* membranous, oblong-elliptic to oblanceolate-elliptic, shortly and stoutly acuminate, the base much narrowed, both surfaces brown when dry, main-nerves 8 to 14 pairs, curved, spreading, rather faint on both surfaces, length 3.5 to 8 in, breadth 1.25 to 2.5 in, petiole 4 to 7.5 in occasionally as much as 1.25 in long. *Stipules* broadly oblong, narrowed to the apex, but not acute, 3 to 5 in long, deciduous. *Cymes* on naked peduncles (3 to 1.5 in long) in broad panicles 1 to 2 in long and as much wide (more when in fruit), branches divaricating, puberulous, with small broad bracteoles. *Flowers* in small cymes, on the ultimate branches, 1 in long, on short pedicels, glabrous outside. *Calyx* cupular with irregular, short, sharp teeth. *Corolla* longer than the calyx, widely tubular, with 5 broad sub-acute lobes, the throat sericeous. *Anthers* 5, oblong, blunt, attached by short filaments in the throat. *Fruit* elliptic, with a wide shallow areola on the apex, the sides with 10 bold vertical ridges (2 of them double), glabrous, about 2.5 in long and 2 in in diam. *Seeds* plano convex, the convexity deeply 5 grooved, the ventral surface flat. *P. sulcata*, Wall. Cat 8370, Hook fil Fl Br Ind III 168. *P. Jacku*, Hook fil Fl Br Ind III 167.

MALACCA Griffith (K D) 3021, Goodenough 1878, Derry 457, 1224, Ridley 1600. PANGKORE Curtis 1369. TRANG Wray 2778. NEGRI SEMBILAN Ridley 1930. SELANGOR Ridley 7434. PERAK Scortchinni, Ridley 2919, 3067, Wray 290, 2027, 2778, 2956, King's Collector 2655, 4275, 4374, 5964, 6327, 7224. PENANG Wallich 8343, 8370.—DISTRIB Burma, Helfer & Griffith (K D) 3040, Sumatra, Forbes, Java, Blume, Borneo, Beccari, Motley, Haviland.

20 *PSYCHOTRIA BIRCHIANA*, n sp, King & Gamble. Herbaceous, woody at the base, all parts softly rusty-pubescent, stems 6 to 18 in high, thinner than a goose-quill, their pubescence crisped, dense, coarse, and entirely or partly deciduous. *Leaves* thickly membranous, elliptic to elliptic-oblong, sometimes sub-obovate, acute, the base rounded or minutely cordate or sometimes cuneate, both surfaces brown when dry, the lower sometimes paler and with fewer hairs, the midrib prominent and very hairy on both sides, the 10 to 12 pairs of rather faint little-curved spreading main-nerves less hairy than the midrib, length 3.5 to 5 in, breadth 1.5 to 2.25 in, petiole .5 to 1 in, covered with coarse tomentum mixed with ovate-acuminate scales. *Stipules* oblong-ovate, acuminate, .5 to .75 in long. *Cymes* pedunculate, solitary, terminal, spreading, 1.5 to 2 in across, and about as long, the branches spreading, bracteate at the divisions, the bracts lanceolate,

acute, reflexed, .2 or .3 in. long; the peduncle 1.5 to 2.5 in. long, scaly, tomentose; ultimate branches short, bearing at their apices dense capitules of small sub-sessile flowers, mixed with short broad bracteoles. *Flowers* about .1 in. long. *Calyx* cupular-campanulate, pubescent; the mouth wide and with 5 blunt, triangular, spreading lobes. *Corolla* exceeding the calyx, widely tubular, with 5 or 6 short inflexed teeth, glabrous inside, hairy outside. *Anthers* oblong, blunt at each end, the filaments short. *Fruit* ellipsoid, tapering equally to each end, boldly 10-ridged, somewhat compressed, crowned by the hairy calyx-lobes, otherwise sub-glabrous, .25 to .3 in. long and .2 in. across. *Seeds* with 5 dorsal ridges, the ventral surface plane.

PERAK, on Birch's Hill, elev. 4,000 feet: *Scortechini* 258; *Wray* 1; *King's Collector* 2134, 2950, 7348. SELANGOR: *Rudley* 7432.

The flowers are described as white, and the ripe fruit as cherry red. Named in honour of Mr Birch, a British civil officer, who was murdered by the aborigines in Perak.

21. *PSYCHOTRIA FULVA*, Buch.-Ham. ex. Wall. Cat 8366, excl. B. A shrub; young branches thinner than a goose-quill, dark brown when dry, bearing a few scattered coarse hairs. *Leaves* thickly membranous, elliptic, shortly acuminate and tapering almost equally to the base; upper surface without hairs except a few on the midrib near the base, under surface with dark cinereous pubescence on the midrib and 15 to 18 pairs of sub-horizontal slightly curved main-nerves, length 5 to 7 in., breadth 1.75 to 3.5 in.; petioles 1.25 to 2.4 in., coarsely and deciduously pubescent. *Stipules* membranous, broadly oblong, the apex deeply and acuminately bifid, the edges coarsely ciliate; length about 1 in. *Cymes* pedunculate, axillary, trichotomous, the flowers in condensed capitular cymes at the ends of the short branches, enveloped when in bud in 2 or 3 large deciduous bracts; in fruit about 2 in. across and less in length; peduncles about 2 in. long; branches about .5 in. long, horizontal; all, like the short flower pedicels, coarsely rusty-pubescent. *Calyx* cupular, with 5 deep, spreading, narrow, acuminate lobes. *Corolla* not seen. *Fruit* narrowly elliptic, somewhat compressed, tapering slightly to each end, the apex crowned by the erect connivent calyx-lobes, boldly but somewhat unequally 12-ridged, glabrous, .45 in. long and .25 in. in diam. *Seeds* 5-ridged on the dorsal, the ventral surface flat. Hook. fil. Fl. Br. Ind. III. 169, excl. syn. *P. monticola*, Kurz. *Psychotria*, Wall. Cat. 8337; Griff. Notulæ, IV. 268; Ic. Pl. Asiat. t. 479, f. 2.

PERAK, On Ulu Batung Padang: *Wray* 1615.—DISTRIB. E. Bengal, *Griffith* (K.D.) 3022, 3034, 3035, 3036; Khasia, *Hook f. & Thoms.* 14.

*P. monticola*, Kurz, a Burmese plant, has been reduced to *P. fulva*, Buch.-Ham., but in my opinion it is quite distinct.

22. *PSYCHOTRIA FULVOIDEA*, n. sp., King & Gamble. A small shrub; young branches thinner than a goose-quill, dark-coloured, glabrous. *Leaves* membranous, narrowly elliptic, acuminate, crenulate, the base cuneate; upper surface glabrous, dark brown when dry, the lower reddish-brown; the midrib, nerves and reticulations rusty-pubescent, otherwise glabrous; midrib prominent on both surfaces, the 10 to 14 pairs of spreading, curving main-nerves slightly prominent on the lower; length 6 to 7 in.; breadth 2 to 2.5 in., petiole 1 to 1.8 in. *Stipules* membranous, ovate, caudate-acuminate, the edges irregularly serrate, ciliate, length about 1 in. *Cymes* axillary, trichotomous, condensed, about 2 in. broad when in fruit and 1.25 in. long, on deflexed, coarsely but shortly pubescent peduncles 3 in. long; their branches short, spreading, bracteate at the divisions and coarsely pubescent. *Flowers* condensed into globose capitulate cymes at the apices of the branches, sessile. *Calyx* narrowly campanulate, pubescent, with 5 erect acute teeth. *Corolla* unknown. *Fruit* narrowly elliptic, tapering to each end, the apex crowned by the short pubescent lobes, with 12 deep ridges and grooves, glabrous, .4 in. long and .2 in. in diam. *Seed* dorsally 5-ridged, ventrally 2-grooved.

PERAK: *Scortechini* 538.

This approaches *P. fulva*, but is a smaller plant, with crenulate leaves quite glabrous on the upper surface and nearly so on the lower.

23 *PSYCHOTRIA STIPULACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 164. A shrub, 1 to 2 feet high, all parts except the inflorescence glabrous; stems as thick as a goose-quill, brown when dry. *Leaves* membranous, broadly oblanceolate to elliptic, or oblong, abruptly and shortly acuminate, much narrowed to the base, both surfaces glabrous, when dry brown with a reddish tinge; midrib very stout, main-nerves 11 to 13 pairs, spreading, slightly curved, distinct on both surfaces; length 5 to 9 in.; breadth 2 to 4 in.; petioles .5 to 1.25 in. long, winged near the apex. *Stipules* large, sub-persistent, ovate, sometimes bifid, .75 to 1 in. long, and about .4 in. broad. *Cyme* usually solitary, corymbose, trichotomous, terminal, on a short peduncle, bracteate at the base, about 2 to 3 in. in diam.; its branches puberulous, bracts and bracteoles triangular. *Flowers* .15 in. long, on short pedicels, clustered in dense, cymose, capituliform cymes at the ends of the ultimate branches. *Calyx* campanulate, with 5 broad pubescent lobes, the tube glabrous. *Corolla* longer than the calyx, widely campanulate, 4- or 5-toothed. *Fruit* ellipsoid, sub-compressed, 10-ridged, crowned by the small calyx, .8 in. long, and .15 in. in diam. *Seed* dorsally 5-ridged, ventrally concave, with one central ridge. Wall. Cat. 8329; DC Prod. IV. 519; Hook. fil. Fl. Br. Ind. III. 167.

PENANG: Wallich 8329; Curtis 782. TRANG: Kunth 1882.  
PAHANG: Ridley 2216. PERAK: Ridley 2918; King's Collector,  
1957, 1982; Wray 3440; Scortechini 278, 307, 558, 692.—DISTRIB.  
Sumatra.

24. *PSYCHOTRIA CURTISII*, n. sp., King & Gamble. A shrub, 6 feet high; young branches thinner than a goose-quill, rusty-pubescent. *Leaves* elliptic, sometimes somewhat obovate, tapering equally to each end, shortly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper glabrous or with a few hairs on the midrib near the base, the lower rusty-puberulous between the 9 or 10 pairs of bold, shortly and densely rusty-pubescent curved ascending main-nerves; length 5 to 8 in.; breadth 1.5 to 3 in.; petioles .5 in., densely rusty-pubescent. *Stipules* caducous. *Cyme* solitary, terminal, 3-branched, on a pubescent peduncle from .3 to .5 in. long (much longer in fruit), branches bearing 3 to 5 sessile flowers in capitula at their apices; bracteoles linear. *Flowers* .25 in. long, rusty-pubescent. *Calyx* half-superior, campanulate, the mouth with 5 long, spreading, ovate-acuminate lobes. *Corolla* longer than the calyx, salver-shaped, with 5 oblong lobes. *Fruit* ovoid, tapering to the apex, crowned by the long lobes of the calyx, the sides puberulous, 10-ridged. *Seeds* with 4 ridges on the dorsal surface, the ventral plane.

PENANG: Curtis 2695.

25. *PSYCHOTRIA RHINOCEROTIS*, Reinw. ex Blume Bijdr. 961. A shrub; young branches thinner than a goose-quill, at first rusty-tomentose, afterwards glabrescent and pale brown. *Leaves* coriaceous, obovate-oblong or obovate-oblancoelate, the apex broad, but usually with a small abrupt apiculus, the base cuneate; upper surface olivaceous, glabrous, the lower brown and softly and finely rusty-pubescent; the midrib broad, more prominent on the upper than on the lower surface; main-nerves 10 to 14 pairs, slightly curved, oblique, distinct on both surfaces; length 3 to 5 in.; breadth 1.35 to 2.5 in.; petiole .2 to .6 in., stout. *Panicle* solitary, terminal, 1.5 in. long and slightly wider; branches few, lax, divaricate, cymosely few-flowered. *Fruit* elliptic-ovoid, slightly compressed, with 10 vertical grooves (2 of them double), crowned by the rather broad, bluntly 5-toothed calyx, acutely 10-ridged (2 ridges double), pubescent between the ridges; length .25 in.; breadth .2 in. *Seeds* dorsally 4-ridged, ventral surface plane. Miq. Fl. Ind. Bat. III. 292; DC. Prod. IV. 521; Korth. Kruidk. p. 242.

PERAK: King's Collector 8272; Scortechini.

26. *PSYCHOTRIA MALAYANA*, Jack in Mal. Misc. I. 3; reprinted in Calc. Journ. Nat. Hist. IV. (1843), p. 26. A shrub; young branches

rather thinner than a goose-quill, sub-terete, glabrous, rather pale brown when dry. *Leaves* coriaceous, elliptic or broadly elliptic-lanceolate, shortly and abruptly acuminate, much narrowed to the base; upper surfaces glabrous, brown, shining when dry, the lower dull and sparsely pubescent, often tinged reddish, the edges slightly recurved; main-nerves 12 to 18 pairs, ascending, little curved, bold on the lower surface and faint on the upper; length 5 to 10 in.; breadth 2·5 to 4·5 in.; petioles ·4 to 1·5 in. *Stipules* broadly ovate, blunt, about ·35 in. long. *Cyme* terminal, on an angled, sub-compressed peduncle ·5 to 1 in. long (lengthening in fruit), the branches corymbose, whorled, many-flowered; ultimate cymules 3-flowered. *Flowers* ·5 in. long, 2 on each cymule, on short pedicels (the middle one sessile), minutely bracteolate at the base. *Calyx* under ·1 in. long, tubular, the truncate mouth minutely 5-toothed. *Corolla* tubular, ·4 in. long, with 5 oblong sub-acute lobes; the throat villous inside. *Fruit* ·4 in. long and ·3 in. in diam., elliptic-ovoid, vertically 10-ridged, the apex with very slight remains of the calyx. *Seeds* faintly 4-ridged on the dorsal, the ventral surface plane with a faint central groove. DC. Prod. IV. 520. *P. aurantiaca*, Wall. in Roxb. Fl. Ind., ed Carey & Wall., II. 165; Blume Bijdr. 962; Wall. Cat. 8335. *Grumelia aurantiaca* and *Chasalia expansa*, Miq. Fl. Ind. Bat II 296 and 281.

SINGAPORE: Ridley 6468, 8422, Hullett 904. PAHANG: Ridley 2197. PERAK: King's Collector 6327, 7168; Wray 2956; Scortechini 307.—DISTRIB. Borneo, Java.

The corolla of this is larger than that of any other Malayan species of *Psychotria*, being about ·4 in. long when dry.

#### SPECIES IMPERFECTLY KNOWN.

27. *PSYCHOTRIA WRAYI*, n. sp., King & Gamble. A small shrub, glabrous except the inflorescence; young branches as thick as a swan's-quill, terete, dark-coloured when dry. *Leaves* coriaceous, oblanceolate-elliptic, shortly acuminate, gradually narrowed from about the middle to the short, partially winged petiole, both surfaces dark olivaceous-brown when dry, the midrib rather prominent, main-nerves 13 to 15 pairs, oblique, almost straight, thin but pale and rather distinct on the lower surface, indistinct on the upper; length 6 or 7 in.; breadth 2 to 2·5 in.; petiole about ·5 in., winged above. *Stipules* broadly ovate, sub-acute, the edges coarsely ciliate, ·5 in. long. *Cymes* terminal, on short peduncles, bracteate at the base, umbelliform, widely spreading, about 4 in. broad and only half as long; the branches 4-angled, sub-compressed, pubescent, divergent. *Flowers* crowded at the extremities of the branchlets, ·25 in. long, on short thick pedicels. *Calyx* deeply



cupular, with 5 broad, shallow blunt teeth. *Corolla* much longer than the calyx, widely tubular; lobes 5, blunt, broadly ovate, reflexed, the throat with a little short hair. *Anthers* 5, narrowly elliptic, blunt, on short filaments, almost basifixed, exerted by the reflexion of the lobes of the corolla. *Fruit* unknown.

PERAK: Wray 3959; King's Collector 2755.

28. *PSYCHOTRIA INEQUALIS*, n. sp., King & Gamble. A small unbranched shrub; the stem thinner than a goose-quill, deciduously puberulous, only a foot high, brown when dry. *Leaves* thickly membranous, those of a pair somewhat unequal in size, elongate-obovate, the smaller one oblong-elliptic, all abruptly and shortly acuminate, the base cuneate; upper surface glabrous, minutely pitted when dry; the lower with many coarse pale-brown, crisped, flattened hairs on the midrib and nerves, and a few pale appressed hairs on the interspaces; midrib broad and channelled on both surfaces, as are also the 10 to 13 pairs of pale ascending, slightly curved main-nerves, length 6 to 10 in.; breadth 2.5 to 5 in.; petiole .5 to .75 in., stout. *Stipules* narrowly ovate, acuminate, pubescent, .65 in. long. *Cyme* solitary, terminal, 2 to 3.5 in. long (including the 1 to 2 in. peduncle), pyramidal, everywhere rusty-puberulous, the branches opposite, many-flowered, and with broad abruptly acuminate bracts; the lowest pair exceeding 1 in. in length, reflexed; branchlets divaricate. *Flowers* .1 in. long, on short stout pedicels. *Calyx* small, tubular; its lobes broadly triangular. *Corolla* not much longer than the calyx, its lobes linear with moniliform bluish hairs at their bases and on the throat. *Fruit* unknown.

PERAK: Scortechini 279.

29. *PSYCHOTRIA CONDENSEA*, n. sp., King & Gamble. A small woody shrub; young branches half as thick as a goose-quill, the nodes close together and slightly thickened, the internodes striate, at first scurfy-puberulous but afterwards glabrous. *Leaves* coriaceous, narrowly elliptic or elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface when dry very dark brown, the lower paler and tinged with olivaceous, the midrib prominent and pale; the 5 or 6 pairs of oblique main-nerves visible beneath but not above; length 1 to 1.25 in.; breadth .3 to .5 in.; petiole .05 in. *Stipules* broadly triangular, acuminate, nearly .1 in. long. *Umbel* cymose, 3-branched, terminal, shorter than the leaves; each branch with 3 unequally pedicillate flowers. *Flowers* not seen. *Fruit* globular-ovoid, with 2 prominent furrowed vertical ridges and several obscure ones between them, crowned by the 5-toothed calyx; length .2 in.; breadth .15 in. *Seeds* with one prominent dorsal ridge, ventral surface flat.

PERAK: Scortechini.

## Order LX. VALERIANEÆ.

Herbaceous (as regards the Indo-Malayan species). *Leaves* opposite, exstipulate, their bases often connected by an interpetiolar line or ridge; entire, pinnatifid or pinnate. *Flowers* sessile, in cymes, usually hermaphrodite but sometimes polygamous or diceious, bracteate. *Calyx-tube* adnate to the ovary, the limb in the flower small, in the fruit often enlarged or pappose. *Corolla* superior, gamopetalous, its tube cylindric or gibbous or spurred at the base; the limb with 3 to 5 imbricate lobes, often irregular. *Stamens* 1 to 4, on the tube, usually exerted. *Ovary* inferior with a single perfect, 1-ovuled cell, and 2 barren empty cells; style filiform; stigma 2- or 3-lobed or entire; ovule in the fertile cell pendulous from the apex of the loculus. *Fruit* indehiscent, dry, 1-seeded, the 2 barren cells enlarged or represented by narrow ridges. *Seed* pendulous, with very little or no albumen; embryo straight, radicle superior.—DISTRIB. About 350 species, in temperate climates, generally diffused, but absent from Australia and South Africa.

## VALERIANA, Linn.

Perennial herbs. *Leaves* entire, pinnatifid or pinnate, the radical often undivided and with long petioles. *Flowers* in cymes, corymbosely paniculate; bracts small, oblong or linear, free or nearly so, persistent. *Calyx-limb* in flower obsolete, in fruit develop into a ring of from 5 to 15 feathery bristles, united at their bases into a short funnel-shaped tube. *Corolla-tube* funnel-shaped, its base often sub-gibbous; limb with 5 spreading lobes, both tube and limb pink or white. *Stamens* 3. *Ovary* 3-celled, only 1 cell containing 1 ovule, stigma sub-entire or shortly 3-fid. *Fruit* oblong, plano-convex, with 6 ribs, 1-celled; the 2 barren cells obsolete, crowned by the persistent pappose calyx.—DISTRIB. About 180 species in moist temperate regions.

VALERIANA HARDWICKII, Wall. in Roxb Fl. Ind., ed. Carey & Wall. I. 166. *Root* fibrous. *Stem* erect, 1 to 3 feet high, pubescent below, mostly glabrous upwards but pilose or barbate at the nodes. *Radical leaves* ovate, acute, on long petioles; *stem leaves* unequally pinnatifid, the segments 3 to 5, the upper the longest, all lanceolate or ovate-lanceolate and irregularly toothed. *Panicles* lax, often as much as a foot long, the branches dichotomous, with small subulate bracteoles at the forks; fruit hairy. Wall. Cat. 432, Pl. As. Rar. 39, t. 263, Don Prod. Fl. Nep. 159; DC. Prod. IV. 640; Clarke in Hook. fil. Fl. Br. Ind. III. 213. *V. Hardwickiana*, Roem. & Schult., Syst. I., Mant. 259. *V. tenera*, Wall. Cat. 435; DC. Mem. Valer. 16; Prod. IV. 640.

*V. elata*, Don Prodr. 159. *V. javanica*, Blume Bijdr. 919. *V. acuminata*, Royle Ill. Him. Bot. 241.

At high elevations on the central ridge in Perak, this is said to occur, but I have seen no specimens.

### Order LXI. COMPOSITÆ.

Herbs or shrubs, sometimes scandent, rarely trees. *Leaves* alternate, rarely opposite or whorled; simple or sometimes compound exstipulate. *Florets* numerous, small, aggregated in centripetal heads, sessile on the dilated top of the peduncle (receptacle); the heads surrounded by an involucre of 1- or more-seriate, free or connate bracts; bracteoles none or reduced to paleate scales or bristles on the receptacle; individual florets all tubular (head discoid), or the outer or all ligulate (head rayed); all bi-sexual or the inner bi-sexual or male, the outer female or neuter; sometimes diœcious. *Sepals* connate in a calyx-tube, adnate to the ovary; limb none, or composed of hairs (pappus) or scales. *Petals* connate in a corolla of two forms: (a) tubular or campanulate, with 4-5-lobed limb; lobes valvate with marginal nerves; (b) ligulate with lobes elongated and connate in a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4-5, inserted within the corolla-tube; filaments usually free; anthers basifixed, usually connate (syngenesious); connective produced upwards; cells simple or tailed at the base, pollen sub-globose, rough. *Pistil* an inferior 1-celled ovary; ovule solitary, basal, erect, anatropous, nucleus with one coat; style slender, normally 2-fid; the arms (sometimes) connate, linear or sub-terete, naked or pubescent externally or tipped by pubescent cones; the margins stigmatic. *Fruit* a dry indehiscent achene (cypsela). *Seed* erect; testa membranous; albumen none; embryo straight; cotyledons plano-convex; radicle short.—**DISTRIB.** Universal; genera about 1,000; species about 8,000.

Corollas of all the florets either tubular to near the mouth or the marginal row ligulate; style-arms long, distinct, or very short, or the style sub-entire in the sterile florets of heads with heterogamous florets; stems sometimes woody; leaves alternate or opposite; sap never milky:—

Florets red, purple, or white, never yellow; all similar (homogamous) and tubular, or rarely (*Elephantopus*) cleft laterally; involucre of bracts always more than 1-seriate; pappus present, usually setaceous, receptacle naked or rarely (*Ageratum*) paleaceous:—

Antthers cleft at the base and appendiculate at the apex; style-arms subulate, hairy; leaves alternate (*Vernoniae*):—

Heads distinct, many-flowered; pappus long, copious, cypselas ribbed .. .. . 1. *VERNONIA*.

- Heads 1- or few-flowered, crowded into dense clusters resembling single heads; pappus chaffy .. .. 2. *ELEPHANTOPUS*.
- Anthers sub-entire at the base, either truncate or appendiculate at the apex; leaves opposite at any rate below (*Eupatorieae*):—
- Anthers truncate at the apex .. .. 3. *ADENOSTEMMA*.
- Anthers appendiculate at the apex:—
- Pappus paleaceous, receptacle sometimes paleaceous .. 4. *AGERATUM*.
- Pappus of slender hairs; receptacle always naked; bracts of involucre 4 with sometimes a small outer one; scandent .. .. 5. *MIKANIA*.
- Florets, if homogamous and tubular, yellow; if heterogamous, at least those of the disk yellow; or if none of the florets yellow (*Emilia*) then with the bracts of the involucre 1-seriate
- Anthers appendiculate at the apex (*Asteroidae*).—
- Receptacle naked, smooth, or pitted; sometimes, when pitted, the edge of the pit fimbriate:—
- Bracts of involucre in two rows.—
- Anthers sub-entire at the base; florets all tubular, those of the disk purple, of the ray filiform, yellowish or white; pappus none or of 2 bristles, heads small in lax paniced cymes, bracts of involucre in two series; erect herbs .. .. 6. *DICHOCEPHALA*.
- Bracts of the involucre many-seriate, leaves alternate:—
- Anthers obtuse and entire at the base; florets of disk tubular with wide limb; those of the ray filiform-tubular or tubular only at the base, expanding into small yellowish ligules; pappus copious and silky, heads in dense corymbose panicles; climbers .. 7. *MICROGLOSSA*.
- Anthers cleft at the base; style-arms of hermaphrodite flower filiform, linear, or obtuse, or those of the sterile flowers undivided (*Inuloideae*).—
- Flower-heads medium-sized; separate, solitary, or in corymbose or paniculate cymes, not in globose clusters, if clustered the cypselas with copious soft pappus:—
- Herbs; bracts of involucre narrow; flowers not corymbose:—
- Anther-cells tailed at the base, the tails of adjacent anthers confluent .. .. 8. *BLUMEA*.
- Anther-cells sagittate at the base, not tailed or connate .. .. 9. *LAGGERA*.
- Shrubs; bracts of involucre broad; flowers corymbose .. .. 10. *PLUCHEA*.
- Flower-heads small, clustered in dense ovoid or globose masses; herbs with winged stems; pappus none .. .. 11. *SPHERANTHUS*.
- Bracts of the involucre 1-seriate, sub-equal, free or united, with sometimes a few short outer bractlets

(*calyculus*) at their bases; heads homogamous; anther-cells sub-entire at the base; receptacle naked (*Senecionidae*):—

Leaves alternate; pappus of fine hairs, style-arms of hermaphrodite flowers truncate or obtuse, penicillate or with a hairy tip:—

Heads ebracteate; florets purple .. .. 12. *EMILIA*.

Heads bracteolate; florets yellow .. .. 18. *GYNURA*.

Receptacles paleaceous; anthers sub-entire at the base; bracts of involucre 1- to many-seriate; heads usually radiate, heterogamous; style-arms truncate or appendiculate, or those of the sterile florets entire; pappus of 2 to 4 arms or paleaceous or absent; leaves at the base of the stem usually opposite, those higher up opposite or alternate (*Helianthoidae*):—

Pappus of only 4 bristly awns, or cup-like or absent:—

Cypselas all thick, or those of the ray-florets 3-angled and those of the disc laterally compressed; pappus cup-like or composed of 2 to 3 stiff chaffy or bristly arms, with or without intermediate smaller scales or altogether absent; leaves usually opposite:—

Inner bracts of the involucre embracing and enclosing the cypselas of the fertile ray-florets; pappus absent, outer bracts of involucre 5, glandular .. .. 14. *SIEGESBECKIA*.

Inner bracts of the involucre all flat, scales of receptacle flat, very narrow, usually few; disk-florets 4-5-fid, ligules small; pappus absent, or if present shortly 2-awned; outer bracts of involucre numerous .. .. 15. *ECLIPTA*.

Scales of the receptacle concave or complicated more or less enclosing and embracing the disk florets —

Cypselas not winged, compressed or 8-5-angled, ray-florets yellow with large ligules; disk-cypselas with 1 or 2 short deciduous awns; leaves all opposite .. .. 16. *WEDELIA*.

Cypselas of the disk-florets ciliate, winged on the margins, laterally compressed; heads small; leaves always opposite .. .. 17. *SPILANTHES*.

Cypselas more or less depressed from the top; pappus of 2 (rarely 3 or 4) bristles or absent:—

Outer bracts of the involucre almost equal; herbaceous; inner bracts separate, almost resembling the scales of the receptacle; ray-florets fertile; leaves opposite:—

Cypselas flat, their margins lacerate and winged; pappus composed of bristles .. .. 18. *STYNEDELLA*.

Outer bracts of the involucre few, small; inner bracts connate below, membranous:—

- Cypselas not beaked; leaves opposite, simple to pinnatisect .. .. 19. *BIDENS*.
- Pappus of membranous scales; heads radiate; leaves opposite:—
- Scales of pappus feathery, fringed; heads medium-sized .. .. 20. *TRIDAX*.
- Anthers inappendiculate at the apex; receptacle (in our species) not paleaceous; pappus absent or reduced to a raised rim, rarely scaly and short; leaves usually alternate (*Anthemideae*):—
- Flower-heads discoid, heterogamous, pappus absent —
- Florets of the circumference very numerous; cypselas flat or concave at the top; flower-heads globose or hemispheric, sub-sessile, bracts of involucre in 2 series, spreading in fruit .. .. 21. *CENTIPEDA*.
- Florets of the circumference few; heads very small, in racemes or panicles; cypselas ellipsoid or obovoid, rounded at the apex .. .. 22. *ARTEMISIA*.
- Corollas of all the florets flatly expanded from a tubular base, ligulate, their apices 5-toothed; leaves radical or cauline and alternate, never opposite; stem always herbaceous, fistulose; sap milky (*Cichorieae*):—
- Pappus of simple hair-like bristles, at least in the central florets; florets yellow, cypselas fusiform or oblong, with glabrous or puberulous ribs .. .. 23. *CREPIS*.
- NOTE.—The above key is taken mainly from "Bengal Plants," by Lieut.-Col. D. Prain, F.R.S., Superintendent, Royal Botanic Garden, Calcutta.

# 1. *VERNONIA*, Schreb.

Herbs, shrubs, climbers or small trees. *Leaves* alternate, penninerved, entire or dentate. *Heads* axillary or terminal, solitary or in cymes or panicles, homogamous; flowers often few, but very rarely solitary. *Involucre* ovoid, globose or hemispheric, as long as or shorter than the flowers; bracts in many series, the inner longest. *Receptacle* naked or pitted, sometimes with short hairs. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anther-bases* obtuse, sagittate. *Style-arms* subulate, acute, hairy. *Cypselas* striate, ribbed or angled, rarely terete, truncate at the apex; pappus of many hairs, usually in two rows, the inner hairs thin and slender, the outer sometimes stout and compressed, persistent or deciduous.—*DISTRIB.* About 500 species, mostly American.

- A large shrub or small tree; leaves sub-coriaceous; involucrel bracts obtuse .. .. 1. *V. arborea*.
- Herbaceous annuals; leaves membranous; involucrel bracts acuminate:—
- Heads few, 35 in. in diam., in long-peduncled cymes.. .. 2. *V. chinensis*.

Heads numerous, 2 to 25 in. in diam., in loose terminal corymbose cymes .. .. . 3. *V. cinerea*.

1. *VERNONIA ARBOREA*, Buch.-Ham. in Trans. Linn. Soc. XIV. 218. A tree, 30 to 60 feet high; young branches as thick as a goose-quill or thinner, at first covered, like the under surfaces of the leaves and branches of the inflorescence, with short rusty tomentum, sometimes glabrous or glabrescent. *Leaves* sub-coriaceous, entire, elliptic ovate or ovate-oblong, acute or shortly acuminate, the base rounded or cuneate; upper surface glabrous, or nearly so, except the midrib, the reticulations minute and distinct; main-nerves 8 to 14 pairs, spreading, interarching, bold and distinct on the lower surface, more faint on the upper; length 3.5 to 6 in.; breadth 1.75 to 2.75 in.; petioles .75 to 1.25 in., pubescent. *Heads* 2- to 5-flowered, collected in large open terminal panicles much longer than the leaves. *Involucral bracts* few, small, oblong, obtuse, less than half as long as the flowers, pubescent, concave, persistent. *Corolla* glabrous, bluish. *Cypselas* not conspicuously ribbed, short, truncate; pappus in a single row, tuberculate, white tinged with ochraceous, persistent. DC. Prod. V. 22; Kurz For. Fl. Burm. II. 80; Clarke Comp. Ind. 23; Hook. fil. Fl. Br. Ind. III. 239. *Vernonia javanica*, *Blumeana* and *celebica*, DC. l.c. 21, 22; Miq. Fl. Ind. Bat. II. 9, 10. *Eupatorium celebicum* and *javanicum*, Blume Bijdr. 903 *Conyza acuminata* and *arborea*, Wall. Cat. 3034A and 3074.

MALACCA: Griffith. SINGAPORE: Lobb; Ridley 2735, 2739, 9478; Maingay (K.D.) 948, 949, 950. PENANG: Curtis 2, 926. NEGRI SEMBILAN: Ridley 10087. SELANGOR: Ridley. PERAK: Wray 2240, 2442; King's Collector, many Numbers; Scortechini.—DISTRIB. Ceylon, Malay Archipelago, Philippines, China.

2. *VERNONIA CHINENSIS*, Less. in Linnæa, VI. 674. An erect annual with divaricate, softly puberulous to tomentose, angled branches. *Leaves* alternate, sessile or petiolate, membranous, ovate elliptic elliptic-lanceolate or oblanceolate, narrowed at the base, sub-serrate or entire. *Heads* few, .35 in. in diam., in lax, few-branched, axillary and terminal, open puberulous cymes, on slender peduncles longer than the leaves, 15- to 30-flowered. *Involucral bracts* not numerous, lanceolate, awned or acute, usually at first pubescent outside, inside glabrous, shining, 1-nerved; longer than the glabrous or glabrescent corollas. *Cypselas* less than 1 in. long, 4- or 5-ribbed, glabrous. *Pappus* scanty, white. Clarke Comp. Ind. 78; Hook. fil. Fl. Br. Ind. III. 235. *V. albicans*, DC. in Wight Contrib. 6; Prod. V. 26 (in part). *Cyanopsis pubescens* and *C. villosa*, DC. Prod. V. 69. *Conyza chinensis*, Lamk. Dict. II. 83 (not of Linn.). *C. punctulata*, Wall. Cat. 2995. \* *Eupatorium menthaefolium*, Wall. Cat. *Cynanthillium villosum* and *C. pubescens*, Blume

Bijdr. 889 and 890. *Centratherum chinense*, Less. in Linnæa (1829) 320. *Synanthera*, Wall. Cat. 7136.

PENANG: *J. Scott*; *Curtis* 931; *King*; *Deschamps*; MALACCA: *Cuming*; *Griffith*; *Hullett* 634. SINGAPORE: *King*.—DISTRIB. Malay Archipelago, Philippines.

3. *VERNONIA CINEREA*, Less. in Linnæa, IV. 291, and VI. 673. Herbaceous, erect, 6 to 18 in. high, with more or less minute whitish pubescence everywhere; stems slender, striate. *Leaves* membranous with variable petioles, ovate or lanceolate, sometimes obovate or oblanceolate, the apex obtuse or acute, the edges obtusely or acutely toothed, the base narrowed, both surfaces olivaceous-cinereous when dry, the upper glabrous or nearly so, the lower more or less cinereous-pubescent; length 1·5 to 3 in.; breadth ·3 to ·5 in.; petiole ·1 to ·5 in. (in the lower leaves). *Heads* ·2 to ·25 in. in diam., on 10- to 20-flowered, loose, terminal, long-peduncled, corymbose cymes with divaricate branches; bracts of peduncle very few. *Involucral scales* linear-lanceolate, acuminate or almost awned, shorter than the florets, 1-nerved, ·1 in. long, densely pubescent. *Corolla* pubescent, the tube very narrow lavender. *Cypselas* minute; pappus copious, dirty white, the outer row very short. DC. Prod. V. 24, in Wight Contrib. 6; Wall. Cat. 3008; Hook. fil. Fl. Br. Ind. III. 234; Miq. Fl. Ind. Bat. II. 11; Prain Bengal Plants, 590. *V. conyzoides*, DC. in Wight Contrib. 6; Prod. V. 25. *V. rhomboidea* and *V. montana*, Edgew. in Trans. Linn. Soc. XX. 62. *V. albicans*, DC. in Wight Contrib. 6 (*in part*), Wight Ic. 1076. *V. abbreviata* and *leptophylla*, DC. l.c. 25. *V. laxiflora*, Less. in Linnæa, VI. 646; DC. l.c. 25. *V. physalisfolia*, DC. in Wight Contrib. 6; Prod. Fl. Pen. Ind. Or. 24. *V. parviflora*, *linifolia*, and *fasciculata*, Reinw. in Bl. Bijdr. 893. *V. Zollingeriana*, Schultz-Bip. in Miq. Fl. Ind. Bat. II. 16. *V. cyanonioides*, Walp. in Linnæa XIV. 509. *Conyza abbreviata*, Wall. Cat. 3048, *C. bellidifolia*, id. 3047; *cinerascens*, 3062; *incana*, 3046; *linifolia*, 3063, *elegantula*, 3049; *ovata*, 3097, and *sub-simpler*, 3003. *C. cinerea*, Linn. Sp. Pl. 862; Wall. Cat. 3008. *C. prolifera* and *C. heterophylla*, Lam. Encycl. II. 84. *Serratula cinerea*, Roxb. Hort. Beng. 60. *Chrysocoma purpurea*, Forst. Prod. 54. *C. violacea*, Schum. Pl. Guin. 384. *Cyanopsis decurrens*, Zoll.

In all the provinces, in waste places near cultivation.—DISTRIB. All tropical countries.

## 2. ELEPHANTOPUS, Linn.

Perennial rigid herbs. *Leaves* alternate, sessile, penninerved, entire or dentate, mostly radical. *Heads* homogamous, each containing 1 to 5



flowers, and collected into ovoid or globose clusters, surrounded by several large leafy bracts. *Involucre-proper* compressed, its component bracts oblong, acute, about 8, dry, stiff, unequal, alternately flat and conduplicate; receptacle naked. *Flowers* all equally 4-lobed, and cleft on one side, and with the lobes spreading in a somewhat palmate manner. *Anthers* obtusely sagittate at the base. *Style-arms* subulate. *Cypselas* truncate, 10-ribbed; bristles of pappus few, rigid, shining, slender and dilated below or chaffy.—*DISTRIB.* 10 or 12 species, chiefly tropical American—one cosmopolitan.

*ELEPHANTOPUS SCABER*, Linn. Sp. Pl., 814. Stems dichotomous, from a few inches to 2 feet high, terete, finely strigose. *Leaves* membranous, the radical ones obovate, oblong to elliptic-oblong, tapering to the short petiole, the edges dentate or crenate, up to 6 in. in length and 1.25 to 2.5 in. broad; the cauline few, smaller, sessile, both sets scabrid on the upper surface and finely strigose on the lower; main-nerves 6 to 8 pairs in the cauline, more numerous in the radical leaves, all slightly prominent on the lower surface. *Collective heads* hemispheric, .5 to .75 in. in diam., solitary, terminal, on long peduncles. *Bracts* of the conjoined heads 3, leaf-like, about .5 in. broad, broadly ovate or reniform, apiculate, nervose and pubescent behind; bracts of the involucre-proper shining, glabrous; pappus of 5 shining tuberculate bristles, dilated at the base. Wall. Cat. 2979; DC. Prod. V. 86; Roxb. Fl. Ind. III. 445; Don Prod. 169; Wight Ic. 1086; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 590.

In all the provinces, in cultivated places.—*DISTRIB.* In most tropical countries.

### 3. ADENOSTEMMA, Forst.

Herbs, glandular-pubescent or glabrous. *Leaves* mostly opposite, petiolate. *Heads* homogamous, in lax corymbose cymes; involucre campanulate; its bracts numerous, sub-2-seriate, narrow, herbaceous, sometimes connate; receptacle flat, naked. *Corollas* all equal, tubular, regular, with short tube and campanulate 5-toothed limb. *Anthers* truncate, with glandular apiculus, their bases obtuse. *Style-arms* elongate, dilated near the apex. *Cypselas* obtuse, 5-ribbed, glandular; pappus of 3 to 5 short rigid, often clavate hairs, joined at their bases by a narrow ring.—*DISTRIB.* Species 5 or 6 American, 1 cosmopolitan.

*ADENOSTEMMA VISCOSUM*, Forst. Char. Gen. 20. An erect, rarely decumbent annual, slender or robust, glabrous; pubescent or viscidly pubescent. *Leaves* membranous, sessile or petiolate, opposite or the upper alternate, from linear to broadly ovate, acute sub-acute cuneate or cordate at the base, the edges serrate crenate or entire, the upper surface usually smooth but sometimes rugose; length from 2 to 6 in.;

petioles varying in length *Heads* 3 to 4 in in diam, in lax corymbose, pedunculate cymes *Involucral bracts* oblong, obtuse or acute, glabrous, glandular or scabrid *Corollas* white, pubescent near the mouth, styles much exserted, the arms clavate *Cypselas* usually warted, crowned by a glandular ring, bearing pedicellate lobed glands DC Prod V. 111, Clarke Comp Ind 28, Hook fil Fl Br Ind III 242, Prain Bengal Plants, 591

In all the provinces, but not abundant in any of them —DISTRIB The tropics generally

In the Flora of British India, III 242, Sir Joseph Hooker recognises seven varieties of this widely distributed and variable species And to one or other of these he reduces the following eleven species of De Candolle *A fastigiatum* DC Prod V 111, *A leucarpum*, *A Roylei*, *A elatum*, *A latifolium* l c p 112 *A macrophyllum*, *A parviflorum*, *A reticulatum*, *A viscosum* *A maduense* *A erectum* l c p 113 He also reduces here the following *Ageratum aquaticum*, Roxb Fl Ind III 415 *A strictum*, Bot Mag t 2410 *Lavania fastigiata*, *macrophylla* and *parviflora* Blume Bijdr pp 905 and 906 and the following Nos of the Wallichian Catalogue viz, *Lavania erecta*, 3218, *carnosa*, 3219, *alba*, 3220, *rugosa* 3221, *viscida* 3222

#### 4 AGFRATUM, Linn

Erect herbs *Leaves* opposite in the lower part of the stem alternate in the upper *Heads* in panicles or corymbs, homogamous *Involucre* narrowly campanulate, its bracts in 2 or 3 series, linear, subequal, receptacle convex, naked or with deciduous scales *Corollas* all tubular, equal, regular, the limb 5-cleft *Anthers* with slight apical appendages their bases obtuse *Style arms* elongate, obtuse *Cypselas* 5 angled, pappus of 5 short, free or connate scales, or of 10 to 20 narrow, unequal scales —DISTRIB About 20 species, all probably American, several introduced in the Tropics of the Old World

AGERATUM CONIZOIDES, Linn Sp Pl 839 Annual, 1 to 2 feet high, everywhere with sparse white rather soft pubescence *Leaves* membranous, ovate, sub acute, the base broad and sub truncate, sometimes cuneate, the edges coarsely crenate or dentate both surfaces greenish when dry, the upper sparsely hispid, the lower glabrous, boldly reticulate, main-nerves about 2 or 3 pairs, ascending, curved, the lower one branching, length 1 to 3.5 in *Heads* 2.5 in in diam, in terminal or axillary corymbose cymes *Involucral bracts* shorter than the flowers, narrowly lanceolate, acute, 3-nerved, puberulous *Corollas* pale blue or white. *Cypselas* black, pappus of 5 shining, spreading scales, with broad, often serrate bases DC Prod V 108 Clarke Comp Ind 30, Wall Cat 3176, Hook fil Fl Br Ind III 243, Prain Bengal Plants, 591 *A. cordifolium*, Roxb Fl Ind III 415; Wall. Cat 3177

In all the provinces, in cultivated places.—DISTRIB. The tropics generally.

#### 5. MIKANIA, Willd.

A twining herb (in Indo-Malaya). *Leaves* opposite, petiolate. *Heads* small, in spikes racemes or panicles, homogamous, usually 4-flowered. *Involucre* oblong, its bracts 4, narrow, sometimes with a small outer one; receptacle small, naked. *Corollas* all equal, regular, tubular, the tube narrow; the limb campanulate, 5-fid. *Anthers* appendiculate, the base obtuse. *Style-arms* long, acute. *Cypsels* with truncate apices, 5-angled; pappus with one or more rows of scabrid hairs, often connate at the base.—DISTRIB. About 60 species, all in the warm parts of America and Africa except the following.

*MIKANIA SCANDENS*, Willd. Sp. Pl. 1743. A glabrous or puberulous climber; young branches less than half as thick as a goose-quill, brown and striate when dry. *Leaves* membranous, on long petioles, ovate, acuminate; the base broad, cordate, often almost sagittate, the edges sinuate; main-nerves a single pair, ascending from the base and branching outwards; length 1 to 2 in.; breadth .6 to 1.25 in.; petioles .5 to 1 in., slender. *Heads* narrow, 4-flowered, in lax corymbose cymes, on slender peduncles much longer than the leaves, peduncles and branches angled when dry, puberulous. *Scales of involucre* chaffy, narrowly oblong, obtuse. *Cypsels* glabrous; pappus reddish. DC. Prod. V. 199; Clarke Comp. Ind. 34; Hook fil. Fl. Br. Ind. III. 244; Prain Bengal Plants, 592. *M. volubilis* and *M. chenopodifolia*, Willd. l.c. 1745; DC. l.c. 199 and 201. *Eupatorium scandens*, Linn.; Jacq. Ic. t. 169.

In all the provinces, common.—DISTRIB. British India, Malay Archipelago, Tropical Africa.

#### 6. DICHROCEPHALA, DC.

Annuals, with alternate toothed lyrate or pinnatifid leaves. *Heads* small, heterogamous, globose or hemispheric, not rayed, in panicles; *Outer florets* ♀, in many rows, slender, fertile, rigid, 2-3-toothed or cleft. *Disk-florets* ♂, fertile, narrow, 4- or 5-toothed. *Anthers* with truncate bases. *Style-arms* of ♂ florets short, flattened, the tips lanceolate; pappus none or (in the ♂) of 2 minute bristles.—DISTRIB. Species 5, Asiatic and African.

*DICHROCEPHALA LATIFOLIA*, DC. in Guill. Archiv. Bot. II. 518. An annual weed, 12 to 24 in. high, erect or spreading, glabrous pubescent or villous. *Leaves* very variable, ovate lanceolate or obovate, entire pinnatifid or lyrate, with the terminal lobe broadly ovate and coarsely

toothed; length 1 to 4 in.; petioles .25 to 1.25 in. Heads about .15 in. in diam., globose, on pedicels many times longer than themselves, in lax, few-branched, cymose panicles. Ray-florets ♀, filiform, obscurely 2-3-toothed, white. Disk-florets ♂, 4-cleft, yellow. Cypselas very small, smooth, with a callous margin, and often with 2 small bristles. DC. in Wight Contrib. 11, Prod. V. 372; Wight Ic. 1096; Clarke Comp. Ind. 36; Hook. fil. Fl. Br. Ind. III. 245. *D. gracilis* and *D. sonchifolia*, DC. l.c. 371, 372. *Cotula sinapifolia*, Roxb. Hort. Beng. 63, Fl. Ind. III. 437; Wall. Cat. 3237. *C. bicolor*, Roth Cat. Bot. II. 116. *C. latifolia*, Pers. Syn. II. 464. *Grangea latifolia*, Lam. Ill. t. 699. *Hippia bicolor*, Smith in Rees Cyclop. XVIII. *Ethulia integrifolia*, Don Prodr. 182.

PERAK: *Scortechini*.—DISTRIB. British India, tropical and sub-tropical Asia and Africa.

#### 7. MICROGLOSSA, DC.

Slender shrubs, often scandent. Leaves alternate, entire. Heads small, heterogamous, collected in large corymbose panicles. Ray-florets ♀, in 1 or more series, fertile, the ligule minute, white. Disk-florets few or many, ♂, fertile, tubular, with dilated 3- to 4-fid limb. Involucre campanulate, composed of several series of narrow bracts, the outer shorter. Receptacle flat, naked or nearly so. Corolla, the ligulate or ray ones narrow, about as long as the style; those of the disk (the tubular) longer. Anthers with obtuse bases, entire. Style-arms of the ♀ flattened; their tips long, lanceolate. Cypselas angled; pappus hairs numerous, slender, silky, in one or two series, somewhat unequal — DISTRIB. About 6 species, Asiatic and African.

MICROGLOSSA VOLUBILIS, DC. Prod. V. 320. A sub-scandent shrub; branches half as thick as a goose-quill, ridged, glabrous. Leaves membranous, ovate-lanceolate, acuminate, the base cuneate or rounded, the edges obscurely toothed; both surfaces brown when dry, glabrous, the lower sometimes slightly pubescent; main-nerves 4 or 5 pairs, little curved, ascending, prominent beneath; length 1.5 to 2 in.; breadth .65 to 1.25 in.; petioles .25 to .4 in., slender. Heads .35 in. in diam., on short peduncles, crowded in dense corymbose terminal cymes, much longer than the leaves. Cypselas compressed, 4-angled, puberulous; pappus copious, reddish, much longer than the minute achenes. Clarke Comp. Ind. 57; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 257. *Conyza volubilis*, Wall. Cat. 3057. *Erigeron pyrifolius*, Benth. Fl. Hongk., 176.

PERAK: *Ridley* 2890; *Wray* 2472. PENANG: *Walluch* 3057. —DISTRIB. British India, Burma, Malay Archipelago, China.

## 8. BLUMEA, DC.

Herbs, annual or perennial, glandular-pubescent or woolly. *Leaves* alternate, rarely entire, usually lobed or toothed. *Heads* in paniculate cymes, rarely in racemes, heterogamous, disciform, yellow or purplish. *Ray-florets* in several series, ♀, fertile, filiform, 2- or 3-toothed. *Disk-florets* ♂, few, fertile, with slender tube and 5-toothed limb. *Involucre* ovoid or campanulate; its bracts in several rows, narrow, acute, herbaceous, the outer smaller, receptacle flat, naked. *Anthers* with sagittate bases produced into small slender tails. *Style-arms* of the hermaphrodite flower flattened or filiform, rarely connate with the nearest anthers. *Cypselas* small, sub-terete or angular, with or without ridges; pappus hairs in a single row, slender, often caducous.—**DISTRIB** About 60 species, in tropical and sub-tropical Asia, Africa, and Australia.

- Scandent; pappus white .. .. . 1 *B. chinensis*  
 Large shrub, pappus red .. . . . 2 *B. balsamifera*  
*Erect herbs; pappus white.*—  
*Heads in small sessile clusters of 2 or 3 in the axils of small bracts on an elongated pseudo-spike* .. .. . 3. *B. glomerata*  
*Heads few (1 to 6), in short, axillary condensed, pedunculate cymes; leaves oblanceolate or obovate, dentate but not lobed, flowers purple* .. .. . 4. *B. Wightiana*.  
*Heads sessile or sub-sessile, in lax, shortly-branched, leafy cymose panicles; leaves oblanceolate, dentate but not lobed, flowers yellow* .. .. . 5. *B. lacera*.  
*Heads sessile or sub-sessile, in axillary spikes several inches long, arranged in a pseudo-panicle; leaves oblanceolate, dentate and sometimes lobulate; flowers yellow* .. .. . 6. *B. membranacea*.

1 *BLUMEA CHINENSIS*, DC. Prod. V. 444. Scandent; young branches half as thick as a goose-quill, glabrous, much striate and dark brown when dry. *Leaves* membranous, elliptic or oblong-elliptic, acuminate or acute, narrowed to the rounded base, the edges with remote, narrow, small sharp teeth, or sub-entire; both surfaces glabrous, the upper dark-brown and shining, the lower paler and tinged olivaceous; main-nerves 4 or 5 pairs, curved, ascending, thin but distinct on the lower surface, faint on the upper; length 2.25 to 3.25 in.; breadth .85 to 1.4 in.; petiole .2 to .3 in. *Heads* .35 in. across, sessile, in small pedunculate axillary cymes, 3 in. long, diminishing upwards to .75 in. in length; the peduncles and their branches everywhere pubescent, sometimes a small cyme with 2 to 4 heads in the same axil as a longer one. *Involucral bracts* of the outer two series short, ovate-lanceolate, blunt, densely pubescent, those of the inner two twice as long

(or more), linear-lanceolate, acuminate, puberulous or almost glabrous, 1-nerved, longer than the copious white pappus; corolla-lobes hairy; receptacle and *cypselas* silky, white. Hook. fil. Fl. Br. Ind. III. 268. *Conyza chinensis*, Linn. Sp. Pl. 862; Blume Bijdr. 898. *B. longispina*, Zoll et Morr. Syst. Verz. 121. *C. serici-vestita*, Wall. Cat. 2996b. *Baccharis nitida*, Wall. Cat. 3043.

PENANG: Curtis 2824; Wallich 2996, 3043. SINGAPORE: Ridley 2744. PERAK: Scortechini 1471

VAR. *riparia*, King & Gamble. Young leaves and stems somewhat hairy; main-nerves of leaves 3 to 4 pairs, depressed on the upper surface. *Blumea riparia*, DC. Prod. V. 444; Clarke Comp. Ind. 85. *Conyza riparia*, Blume Bijdr. 899

PERAK: King's Collector 1214; Scortechini.—DISTRIB. Java, Borneo.

2 *BLUMEA BALSAMIFERA*, DC. Prod. V. 466. A shrub, 6 to 12 feet high; young branches nearly as thick as a goose-quill, tomentose, striate. Leaves thickly membranous or sub-coriaceous, elliptic-lanceolate, coarsely and unequally serrate dentate or sub-entire, acute or sub-acute, narrowed at the base; upper surface dark olivaceous-green, minutely tomentose or strigose, the lower surface with dense silky cinereous-yellowish tomentum; main-nerves 7 to 10 pairs, curved, ascending, faint on both surfaces, but especially on the lower; length 2 to 3 in.; breadth .75 to 1.5 in.; petioles .2 to .75 in. long, the longer ones often with lateral auricles; in the lower part of the branches the leaves often much larger. Heads sub-cylindric, sessile, or on short pedicels, arranged in large, lax, and spreading or dense, often leafy, corymbose or paniced, axillary and terminal tawny-tomentose cymes. Involucral bracts linear, acuminate, densely tomentose; hermaphrodite florets very numerous in the centre, narrowly tubular; receptacle naked. *Cypselas* 10-ribbed, silky; pappus copious, red. Clarke Comp. Ind. 89; Kurz For Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 270; Prain Bengal Plants, 598. *Conyza balsamifera*, Linn. Sp. Pl. ed. II. 1208; Wall. Cat. 2998; Roxb. Fl. Ind. III 427. *C. vestita*, Wall. Cat. 2998. *C. appendiculata* Blume Bijdr. 895 (not of Lam.).

MALACCA: Griffith (K.D.) 3143; Hervey. PENANG: Walker 160; Scott; Curtis 29. PERAK: Scortechini; King's Collector 6343; Wray 1741. SINGAPORE: G. Thomson; Hullett 372; Ridley 2742. JOHORE: King.—DISTRIB. British India, Malay Archipelago

VAR. *angustifolia*, King & Gamble. Leaves narrowly oblong, acute at both ends, less than .5 in. broad.

SINGAPORE: Ridley 2742.

3. *BLUMEA GLOMERATA*, DC. in Wight Contrib. 15. An erect

herb, about 18 to 24 in. high; stem at the base nearly as thick as a goose-quill, sparsely sub-glandular-pubescent, the hairs spreading. *Leaves* membranous, olivaceous, sparsely strigose on both surfaces, the hairs on the upper surface with bulbous bases; the lower sessile, lyrate-lyobed, the lobes dentate, the apex acute; the upper leaves much smaller, lanceolate, dentate. *Heads* from .2 to .25 in. in diam., in small sessile clusters of 2 or 3, all in the axils of small leaf-like bracts along the long slender branches, forming a pseudo-spike. *Involucral bracts* narrowly linear, pubescent, 1-nerved; receptacle glabrous. *Outer florets* with very slender corollas. *Cypselas* faintly 8-10-ribbed, glabrous; pappus in a single row, white, shining. DC. Prod. V. 443; Hook. fil. Fl. Br. Ind. III. 262. *B. fasciculata*, DC. l.c. 442; Clarke Comp. Ind. 81. *B. fistulosa*, Kurz in Journ. As. Soc. Beng. 1877, II. 187. *B. holosericea*, *racemosa*, *spinellosa*, *gracilis*, *purpurea*, and *leptoclada*, DC. l.c. 442, 443. *Conyza fistulosa*, Roxb. Fl. Ind. III. 429. *Conyza racemosa*, *sericea*, *glomerata*, *gracilis*, *purpurea* and *holosericea*, Wall Cat. 3002, 3021, 3055, 3064, 3076, 3103

PENANG: Deschamps.—DISTRIB. British India, Malay Archipelago, China.

4. *BLUMEA WIGHTIANA*, DC. in Wight Contrib. 14. An erect, little-branched herb, 1 to 3 feet high, covered everywhere with silky white, scanty or copious, soft, sub-adpressed hairs; stem terete, about as thick as a goose-quill at the base, striate, brown, and nearly glabrous (from the fall of the hairs) when old. *Leaves* diminishing in size from below upwards, thickly membranous, obovate-oblong or elliptic-obovate, the apex acute or sub-acute, gradually narrowed from about the middle to the short petiole; the edges with a few irregular coarse teeth, sometimes slightly lobed; both surfaces olivaceous-brown when dry, and clothed, but especially the lower, with adpressed, short white pubescence; main-nerve 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.25 to 3 in.; breadth .5 to 1.25 in.; petioles from .1 to .25 in. long or even more, sometimes auricled about the middle. *Heads* paniculate, about .3 or .4 in. across, axillary, solitary or in pairs (reduced cymes), or 4 to 6 in very short rounded axillary cymes on peduncles of varying length, but always short, the upper few inches of the stem crowded by a dense mass of cymes. *Involucral bracts* in several rows, diminishing in size outwards, the inner linear, somewhat longer than the pappus, all pubescent and 1-nerved; receptacle naked. *Outer florets* very numerous, their corollas very slender. *Inner florets* about 4, much wider than the outer. *Cypselas* small, puberulous; pappus in a single row, white. DC. Prod. V. 435; Clarke Comp. Ind. 74; Kurz in Journ. As. Soc. 1877, II. 156 (excl. syn. *hymeno-*

*phylla*); Hook. fil. Fl. Br. Ind. III. 261. *B. trichophora*, *parvifolia*, and *phyllostachya*, DC. l.c. 436, 437, 438. *Conyza lactucifolia*, *paniculata*, *bifoliata*, and *Wightiana*, Wall. Cat. 3088 (*in part*), 3090A, 3091, 3093. *Erigeron molle*, Don Prod. 172.

PENANG and SINGAPORE: By roadsides, not common.—DISTRIB. British India and Ceylon, Malay Archipelago, tropical Australia and Africa.

5. *BLUMEA LACERA*, DC. in Wight Contrib. 14. An erect herb, 2 to 3 feet high; stems at the base nearly as thick as a goose-quill, adpressed-pubescent. *Leaves* thickly membranous, oblanceolate obtuse or sub-acute, much narrowed to the petiole, the edges unequally and remotely dentate; both surfaces olivaceous when dry, the lower somewhat the paler and with thin, pale pubescence; the upper glabrous, sub-scabrid; length 1·5 to 2 in.; breadth ·5 to 1 in.; petiole ·3 to ·5 in. long. *Heads* ·3 in. across, sub-sessile or sessile, in small rounded crowded cymes, on slender ebracteate axillary peduncles, 1 to 2·5 in. long, subtended by small leaf-like bracts, and occupying the upper half of the stem. *Involucral bracts* linear-oblong, tomentose, about as long as the pappus; receptacle naked. *Heads* 4 in. across, sessile or nearly so, in a lax, shortly-branched, leafy, cymose, pubescent panicle, 12 to 18 in. long. *Involucral bracts* nearly uniform, linear, acuminate, 1-nerved, puberulous, as long as the pappus. *Receptacle* slightly convex, naked. *Cypselas* narrowly oblong, glabrous, not ribbed; pappus in a single row, white. DC. Prod. V. 436; Clarke Comp. Ind. 76; Hook. fil. Fl. Br. Ind. III. 263. *B. Musra*, DC. l.c. 435. Deless. Ic. Sel. IV. t. 23. *B. villosa*, Schultz-Bip. in Pl. Hohenack. n. 2a. *Conyza lacera*, Roxb. Fl. Ind. III. 428; Wall. Cat. 3082. *C. thyrsiflora*, *villosa*, and *Musra*, Ham.; Wall. Cat. sub 3082, 3083, 3095. *C. lactucifolia*, DC. l.c. 435; Wall. Cat. 3088 (*in part*); Burm. Fl. Ind. 180, t. 59, f. 1.

PERAK: *Scortechini* 141, 1430. SINGAPORE: *Cantley*; *Hullett* 227.—DISTRIB. British India, Ceylon, Malay Archipelago, China, tropical Africa.

6. *BLUMEA MEMBRANACEA*, DC. Prod. V. 440. A rigid erect herb, 1 to 2 feet high; stem at the base half as thick as a goose-quill, minutely pubescent from base to apex, terete, striate. *Leaves* thinly membranous, oblanceolate, much tapered to the base, sub-sessile, the apex acute, the edges coarsely and often irregularly dentate, sometimes lobulate; both surfaces pale olivaceous-brown when dry, the lower paler, sparsely strigose; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; length 2 to 3·5 in.; breadth ·8 to 1·5 in.; the leaves of the upper part of the stem smaller and bract-like. *Heads* ·25 in. in diam., sessile or sub-sessile, in spikes several inches long, from the



axils of small leaf-like bracts, arranged in a narrow pseudo-panicle occupying the upper half of the stem. *Involucral bracts* linear, acuminate, pubescent, 1-nerved, as long as the inner pappus. *Corollas* very narrow; receptacle naked. *Cypselas* small, glabrous; pappus white, in two rows, the outer very short. Hook. fil. Fl. Br. Ind. III. 265. *B. hymenophylla*, DC. l.c. 440. *Conyza membranacea* and *hymenophylla*, Wall. Cat. 3019, 3038. *C. vinens*, Wall. Cat. 3037D. *C. diffusa*, Roxb. Fl. Ind. III. 429.

PENANG: *Curtis* 2759; *Deschamps*.—DISTRIB. British India, Malay Archipelago.

#### 9. LAGGERA, Schultz.-Bip.

Annual or perennial herbs. *Leaves* alternate, often rigid and decurrent. *Heads* paniced or axillary, heterogamous, disciform. *Outer flowers* ♀, in several rows, fertile, filiform, the mouth minutely toothed. *Disk-flowers* ♂, in several rows, fertile, tubular, 5-fid. *Involucre* campanulate; bracts many-rowed, narrow, often rigid, the outer shorter; receptacle flat, naked. *Anthers* 2-lobed or sagittate at the base, the auricles obtuse or acute, often unequal, not tailed or connate with the adjoining anthers. *Style-arms* of the hermaphrodite flowers and the pappus as in *Blumea*.—DISTRIB. 9 or 10 species, in tropical Africa and British India.

LAGGERA FLAVA, Benth. in Gen. Pl. II. 290. A glabrous or puberulous herb, 6 to 30 in. high; stems striate, simple or corymbosely branched. *Leaves* membranous, shining, glabrous; the radical sometimes on short petioles; the cauline sessile; the lower cauline oblong, acute, cordate and sub-amplexicaul at the base; the upper cauline smaller and narrower than the lower, lanceolate; all sharply and unequally toothed; main-nerves about 8 pairs, distinct, like the wide reticulations. *Heads* few, .25 in in diam., on slender peduncles; receptacle glabrous; corollas yellow; anthers sagittate. *Cypselas* minute, glabrous. *Clarke* Comp. Ind. 90; Hook. fil. Fl. Br. Ind. III. 270. *Blumea flava*, DC. Prod. V. 439. *Erigeron falcatum*, Don Prod 172, Kurz in Journ. As. Soc. Beng., 1877, II. 191 (*excl. syn.*). *Conyza fasciculata*, Wall. Cat. 3017.

PENANG. *Wallich*.—DISTRIB. British India.

This has not been collected within our area since Wallich's time.

#### 10. PLUCHEA, Cass.

Shrubs or herbs, tomentose or glutinous. *Leaves* alternate, dentate or rarely entire, sometimes pinnatifid. *Heads* usually small, in terminal corymbose cymes, or large and sub-solitary, heterogamous, disci-

form, white yellow, or lilac. *Outer florets* ♀, in several series, fertile, filiform. *Disk-florets* ♂, few, sterile, tubular and 5-fid. *Involucre* broadly ovoid or campanulate; its bracts few or in many rows, imbricate, ovate or lanceolate, dry, rigid; receptacle flat, naked. *Corollas* of the ♀ flowers filiform, shorter than their own styles, their apices with 3 teeth; *corollas* of the ♂ flowers regular, tubular, the limb slightly widened, 5-cleft. *Anthers* sagittate at the base, their basal auricles tailed. *Style-arms* of the ♂ flowers filiform, entire or bifid. *Cypselas* small, 4- or 5-angled. Hairs of *pappus* slender, rigid, in a single series, free, or (in the sterile cypselas) connate in groups.—DISTRIB. About 30 species, tropical and sub-tropical.

PLUCHEA INDICA, Less.; DC. Prod. V. 451. A low shrub, glabrous or nearly so; stems smooth, terete. *Leaves* membranous, obovate or oblanceolate, the apex obtuse or acute, acuminate or apiculate, narrowed to the base; edges dentate, serrate or sub-serrate; both surfaces olivaceous-brown when dry, glandular; main-nerves 3 to 6 pairs, curving upwards, bold beneath; length .5 to 2.75 in.; breadth .3 to 1.25 in.; petioles .1 in. to .4 in. long. *Heads* .25 in. in diam., in compound terminal puberulous corymbose cymes, much longer than the leaves, involueral bracts few, rather broad, obtuse. *Florets* of the disk 3, those of the ray numerous. *Cypselas* minute, ribbed, nearly glabrous; pappus scanty, spreading, reddish-white. Wight Ill. t. 131; Clarke Comp. Ind. 93, Hook. fil. Fl. Br. Ind. III. 272; Prain Bengal Plants 600. *P. foliosa*, DC l.c. 451. *Conyza corymbosa*, Roxb. Fl. Ind. III. 426; Wall. Cat. 3009. *C. indica*, Miq. Fl. Ind. Bat. II. 58. *Baccharis indica*, Linn.

MALACCA Griffith. PENANG Wallich. SINGAPORE. Kurz. DINDINGS: Curtis 3451. PERAK Scortechini 848, King's Collector 2893.—DISTRIB. British India, Malay Archipelago, China, Australia

# 11. SPHÆRANTHUS, Linn.

Annual herbs with spreading branches. *Leaves* alternate, toothed, decurrent. *Flower-heads* proper, small, heterogamous, disciform, sessile, on a common receptacle, bracteate or not, and forming solitary, globose, or ovoid, a head-like terminal cluster, usually bearing at its base an involucre of a few empty bracts. *Outer florets* ♀, few or many, fertile, slender; *inner* solitary or few, ♂, fertile or sterile; involucre narrow, its bracts dry, narrow, unequal, acute; receptacle small, naked; pappus none. *Florets*: ♀ with filiform, minutely 2-3-toothed corollas; ♂ with regular corollas with thickened tube and 4-5-toothed limb. *Anthers* with sagittate bases acute or tailed. *Style* of ♂ florets with filiform arms or entire. *Cypselas* oblong, sub-

compressed, without pappus.—DISTRIB. About 8 species, tropics of Asia, Africa, and Australia.

*SPHERANTHUS AFRICANUS*, Linn. Sp. Pl. 1314. Annual, glabrous or pubescent, the stem and branches with long decurrent, entire wings. *Leaves* membranous, oblanceolate, acute or sub-acute, with a small bristle-point at the apex, the base narrowed and confluent with the wing of the branch, the edges bristle-serrate; length 1 to 3 in.; breadth .25 to 1.25 in. *Clusters of heads* globose, .3 to .4 in. in diam., pedunculate, their involucre few, scarious, rounded or jagged, not imbricate; the peduncles .25 to .4 in. long, glabrous, with a wing widening at the base. *Female florets* about 15, gibbous. Hook. fil. Fl. Br. Ind. III. 275; Prain Bengal Plants, 601. *S. africanus* and *S. microcephalus*, Willd. Sp. Pl. III. 2395. *S. microcephalus*, DC. Prod. V. 360; Clarke Comp. Ind. 97. *S. indicus*, Willd. l.c. 2394; Roxb. Hort. Beng. 62, Fl. Ind. III. 446. *S. africanus*, Wall Cat. 3179 (in part).

MALACCA: Griffith. KEDAH: King's Collector 1701. SINGAPORE: Ridley 5069. PENANG: Curtis 1942; Deschamps. PROVINCE WELLESLEY: Ridley 7125. PERAK: Scortechini 1640.—DISTRIB. British India, Malay Archipelago, China, Philippines, Australia, Africa.

## 12. EMILIA, Cass.

Annual or perennial herbs, glabrous or hairy, often glaucous, sometimes sarmentose. *Leaves* alternate, radical, crowded, petiolate, entire, toothed or lyrate-pinnatifid; cauline few, stem-clasping. *Heads* on long peduncles, solitary or loosely corymbose, ebracteolate at the base, homogamous, discoid, yellow or red; florets all ♂, fertile, tubular, the limb elongate and 5-toothed. *Involucre* cylindric; its bracts in a single series, equal, free or cohering, striate; *receptacle* flat, naked. *Style-arms* sub-terete, their apices short and obtuse, or long and acute. *Cypselas* sub-terete, or 5-ribbed or -angled; pappus hairs numerous, white, silky.—DISTRIB. Species 14 or 15; all Indo-Malayan and tropical African.

*EMILIA SONCHIFOLIA*, DC. Prod. VI. 302. Annual, usually erect, sometimes diffuse and sarmentose, 12 to 30 in. high. *Leaves*: the lower lyrate-pinnatifid or sinuate-dentate, rarely elliptic, glabrous or puberulous, sometimes scaberulous, 1.5 to 4 in. long; petioles variable but rarely exceeding an inch in length; cauline leaves much smaller, hastate or linear-hastate, dentate, sessile and auriculate, more or less stem-clasping. *Heads* .4 in. long and the same in diam. when expanded, on long ebracteate or scantily bracteate peduncles, collected in lax terminal long pedunculate spreading corymbs. *Involucre* nearly as long as the purple florets, ecalyculate; its bracts linear-oblong, sub-

acute. *Cypselas* truncate at each end, minutely hairy. DC. in Wight Contrib. 24. *E. sonchifolia*, vars.  $\alpha$  and  $\beta$ , Clarke Comp. Ind. 174. *Calcalia sonchifolia*, Linn. Sp. Pl. 835; Roxb. Fl. Ind. III. 413; Don Prod. 180; Wall. Cat. 3144. *E. glabra*, Heyne in Wall. Cat. 3145. *Gynura ecalyculata*, DC. l.c. 298. *Prenanthes sarmentosa*, Wall. Cat. 3262E. *E. scabra*, DC. l.c. 303; Wight Ic. 1123. *E. mucronata*, Clarke Comp. Ind. 175.

SINGAPORE: *Hullett* 240. PENANG: *Deschamps*; *Scortechini*; *Stolickza*.—DISTRIB. British India, Malay Archipelago, China.

VAR. *minor*, King & Gamble. Little more than a foot high, lower leaves broadly ovate, truncate at the base, on long narrow winged petioles.

PERAK: *King's Collector* 301. PENANG: in Klang and Batu Gaja jungles: *Deschamps*.

In this variety the terminal lobe only of the leaf is developed, the lower part being long and narrow like a petiole.

### 13. GYNURA, Cass.

Succulent herbs, rarely undershrubs, sometimes climbers, glabrous or hispid. *Leaves* alternate, entire, toothed or pinnatisect. *Heads* solitary or in corymbs, bracteolate at the base, homogamous, disciform, yellow or purplish. *Florets* yellow: all the  $\sigma$  tubular, fertile (rarely a few of the outer ones more slender and  $\rho$ ) the limb 5-toothed. *Involucre* cylindric or sub-campanulate; the bracts 10 or 12, in a single series, narrow, equal; their margins scarious; receptacle flat, pitted or shortly fimbriate. *Anthers* with bases entire or sub-auricled. *Style-arms* slender; their apices long, slender, subulate, hispid. *Cypselas* narrow, many-ribbed, hairs of pappus copious, in many series, slender, white.—DISTRIB. Species about 20, Asia, Africa, and Australia.

Scandent; leaves subentire or slightly dentate, petiolate .. 1. *G. sarmentosa*.

An erect herb, leaves always boldly dentate and often pinnatisect or pinnatifid, sessile and often sub-amplexicaul or auriculate .. 2. *G. bicolor*.

1. GYNURA SARMENTOSA, DC. Prod. VI. 298. Stem and branches loosely twining, glabrous except the puberulous peduncles, thinner than a goose-quill, pale brown and striate when dry. *Leaves* succulent, elliptic to elliptic-lanceolate, acute or acuminate, the base cuneate, the edges subentire or slightly dentate, both surfaces brown when dry, glabrous; main-nerves 4 or 5 pairs, spreading, faint on both surfaces; length 1 to 3 in.; breadth  $\frac{1}{4}$  to 1 in.; petioles of the lower leaves  $\frac{1}{5}$  to  $\frac{1}{4}$  in.; the small upper leaves often sessile. *Heads* few,  $\frac{1}{65}$  to  $\frac{1}{75}$  in. long, and as much in diam., on slender puberulous

pedicels usually in scanty, lax, long-peduncled, axillary and terminal cymes longer than the leaves; bracteoles of the panicle and of the calyculus at the base of the involucre few, small, linear. *Involucre* spreading little, its bracts narrowly oblong, subacute or blunt, glabrous; their edges scarious, nearly as long as the florets. *Cypselas* small, brown, with 10 puberulous ribs; pappus white. Hook. fil. Fl. Br. Ind. III. 335. *G. Finlaysonianana*, DC. l.c. 299; Deless. Ic. Sel. IV. t. 55. *Cacalia cylindrifolia*, *reclinata*, and *Finlaysonianana*, Wall. Cat. 3150, 3151, 3162. *Sonchus volubilis*, Rumph. Herb. Amb. V. t. 103 f. 2.

In all the provinces, common.—DISTRIB. Malayan Archipelago; Siam; Philippines.

2. *GYNURA BICOLOR*, DC. Prod. VI. 299. Herbaceous, 2 or 3 feet high, glabrous or sparsely and minutely glandular-hairy on the upper part; stems erect, branched, about the thickness of a quill near the base, boldly striate when dry. *Leaves* pinnatisect or pinnatifid, the lobules acutely dentate; the terminal lobe narrow and acuminate, narrowed at the base into a petiole varying in length from .5 to 1 in.; the upper sessile and often auriculate at the base, or shorter and narrowly obtuse with large teeth; length 2.5 to 5 in.; breadth .4 to 3 in. *Heads* about .5 in. long, less in diam. Involucral bracts narrow, with scarious margins and acute often recurved tips. *Cypselas* very slender, much ribbed, sub-glabrous; pappus copious, white, tinged with pink. Hook fil. Fl. Br. Ind. III. 335. *Cacalia bicolor*, Roxb. Fl. Ind. III. 412; Salisb. Hort. Parad. t. 25; Bot. Regist. t. 110.

SINGAPORE: Ridley 1618. JOHORE: Ridley 2741; King. PERAK: Wray 1445, 3599. PENANG: Deschamps. MALACCA: Griffith (K.D.), 3235.—DISTRIB. China, Moluccas.

#### 14 SIEGESBECKIA, Linn.

Glandular-pubescent herbs. *Leaves* opposite, toothed. *Heads* in leafy panicles, heterogamous, sub-radiate, yellow or white. *Ray-florets* ♀, in a single series, fertile, the corollas short-tubed, with 2-3-fid limb or a short, broad ligule. *Disk-florets* ♂, fertile, or the inner ones sterile; the corollas regular, tubular, the limb campanulate and 5-fid or narrow and 3- to 4-toothed. *Involucre* campanulate or hemispheric, the bracts few, herbaceous, glandular, the outer usually 5, spatulate, spreading; the inner enclosing the ray-florets. *Receptacle* small; the pales membranous, concave. *Anthers* with entire bases. *Style* of ♂ florets with short, flattened, sub-acute arms. *Cypselas* obovoid-oblong, often incurved, their apices obtuse;

pappus none.—DISTRIB. Six species, one cosmopolitan, tropical and sub-tropical, the others South American and African.

*SIRGESBECKIA ORIENTALIS*, Linn. Sp. Pl. 900. An erect annual, 1 to 3 feet high, branching, the lower branches opposite, everywhere clothed with pubescence, often glandular and crisped. *Leaves* membranous, opposite, the lower ovate sub-rhomboid, the upper ovate-lanceolate, dentate or crenate, passing into linear-lanceolate, and sometimes entire; all cuneate at the base; both surfaces olivaceous when dry; the upper scabrid, hispid, the lower more softly hairy; main-nerves 3 or 4 pairs, curved, spreading; length 1 to 4 in.; petioles very short or absent. *Involucre* with the outer bracts longer than the inner. *Cypselas* black, the outer enclosed in the glandular involucre bracts. Boiss. Fl. Orient. III. 250; DC. Prod. V. 495; Wight Ic. 1103; Wall. Cat. 3182; Hook. fil. Fl. Br. Ind. III. 304, Prain Bengal Plants, 607. *S. glutinosa*, Wall. Cat. 3182. *S. brachiata* and *S. orientalis*, Roxb. Fl. Ind. III. 432. *Myrranthus heterophylla*, Turcz. in Bull. Soc. Imp. Nat. Misc. 1851, I. 181.

In all the provinces, near habitations.

### 15. *ECLIPTA*, Linn.

Strigose or hirsute annuals. *Leaves* opposite. *Heads* small, axillary or terminal, pedunculate, heterogamous, rayed. *Ray-florets* ♀, sub-2-seriate, fertile or sterile, ligulate, small, entire or bifid, white rarely yellow. *Disk-florets* ♂, fertile, tubular, 4–5-fid. *Involucre* hemispheric or broadly campanulate; its bracts sub-2-seriate, herbaceous, the outer large and broad; receptacle flat or nearly so, the outer pales enclosing several florets; the inner ones narrow, sometimes absent. *Anthers* with obtuse, almost entire, bases. *Style-arms* flattened, with short triangular or obtuse appendages. *Cypselas* of the ray narrow, triquetrous, sometimes barren; those of the disk stouter, somewhat compressed laterally, the apex entire, toothed or 2-aristate.—DISTRIB. 7 species in South America and Australia, and 1 cosmopolitan in the tropics.

*ECLIPTA ERECTA*, Linn. Mant. II. 266. An erect or diffuse branched slender herb, hirsute or strigillose. *Leaves* variable in form and size, sessile or with very short petioles; linear, oblong-lanceolate or narrowly elliptic; narrowed at both ends; main-nerves 3 or 4 pairs, spreading, faint; length 1 to 4 in.; breadth .2 to .5 in. *Heads* .3 to .4 in in diam., solitary or in pairs from the leaf-axils; the peduncles .25 to 1.5 in. long, when in pairs always unequal. *Involucral bracts* equal to or longer than the flowers, unequal, ovate or obovate, apiculate. *Cypselas* scabrid, without pappus. Clarke Comp. Ind. 134; Hook.

fil. Fl. Br. Ind. III. 304; Prain Bengal Plants; 610. Lam. Ill. t. 687. *E. alba*, Hassk. Pl. Jav. Rar. 528; Clarke Comp. Ind. 134; Hook. fil. Fl. Br. Ind. III. 304. *E. marginata*, Boiss. Fl. Orient. III. 249. *E. prostrata*, Linn. Mant. II. 266; Roxb. Fl. Ind. III. 498. *E. prostrata*, *undulata*, and *parviflora*, Wall. Cat. 3209, 3210, 3213. *Verbesina alba* and *prostrata*, Linn. Sp. Pl. 902.

In all the provinces. In and near cultivated ground.—DISTRIB. The tropics generally.

#### 16. WEDELIA, Jacq.

Hirsute or scabrid-pubescent herbs or undershrubs, sometimes scandent. *Leaves* opposite. *Heads* axillary or terminal, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate, spreading, entire, or 2-toothed at the apex. *Disk-florets* ♂, fertile or the inner sterile; the corolla tubular, regular, with elongate 5-toothed limb. *Involucre* campanulate or sub-hemispheric; its bracts sub-2-seriate, the outer 3 to 5 usually herbaceous, the inner dry; receptacle flat or convex, the pales enclosing the flowers. *Anthers* entire or sub-sagittate at the base. *Style* of ♂ florets, with acute arms hirsute at their tips. *Cypselas* cuneate-oblong or obovoid, thick, smooth or tubercled, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened; pappus none, or reduced to a toothed cup or ring, or sometimes of short scales with occasionally a few bristles.—DISTRIB. Species about 70, tropical and sub-tropical.

WEDELIA BIFLORA, DC. in Wight Contrib. Fl. Ind. 18. Scandent; stem and branches hispid-puberulous when very young, afterwards almost glabrous, obtusely 4-angled, grooved when dry. *Leaves* membranous, broadly ovate or ovate-subrhomboid to lanceolate, apex acuminate, edges coarsely serrate except at the broad, slightly cuneate base; both surfaces dull olivaceous green when dry, minutely reticulate, sparsely hispid-puberulous; main-nerves one large pair ascending from the base of the midrib to near the apex branching outwards and one or two smaller pairs from above the middle of the midrib, all distinct on both surfaces; length 2 to 4.5 in.; breadth 1.25 to 2.75 in.; petioles .75 to 1.5 in., those of the branches smaller. *Heads* about .5 in. in diam., solitary on a short peduncle .75 in. or less in length, or 2 to 4 on peduncles two or three times as long. *Involucral* bracts in two rows, oblong or ovate-lanceolate, apiculate, concave, scabrid-puberulous outside like the peduncles, often recurved. Ripe *cypselas* triquetrous, scaberulous, the apex with some hairs and several short bristles, one longer than the others. Hook. fil. Fl. Br. Ind. III. 306. *W. scandens*, Benth.; Prain Bengal Plants, 612; Clarke Comp. Ind. 136 (excl. syn.). *Woolstonia*

*biflora* and *W. scabriuscula*, DC. Prod. V. 546, 547. *W. biflora*, Wight Ic. 1108. *Verbesina biflora*, Linn. Sp. Pl. Ed. II. 1272. Wall. Cat. 3207 (in part). *V. dichotoma*, Wall. Cat. 3024 (in part). *Eclipta scabriuscula*, Wall. Cat. 3212 (partly). *Acmella biflora*, Spreng. Syst. III. 591.

On the sea coast, common.

# 17. SPILANTHES, Linn.

Annual herbs. *Leaves* opposite. *Heads* axillary or terminal, usually on long peduncles, heterogamous and rayed, or homogamous and disciform. *Ray-florets* ♀, in a single series, fertile, ligulate, white or yellow. *Disk-florets* ♂, fertile, tubular, with 4- or 5-fid limb. *Involucre* ovoid or campanulate, the bracts sub-2-seriate; receptacle convex, elongate, the pales enclosing the flowers often connate with the ovary into a stalk. *Anthers* with truncate entire or bifid bases. *Style-arms* of ♂ florets truncate. *Cypselas* of ray-florets triquetrous or dorsally compressed, the margins and angles usually ciliate; pappus none or of 2 or 3 bristles.—DISTRIB. About 40 species, chiefly tropical American.

SPILANTHES Acmella, Murr Syst. ed. XIII. 610. Erect or ascending, glabrous, branched, 1 to 2 feet long; the branches as thick as a crow-quill, striate, glabrous, pale brown when dry. *Leaves* membranous, ovate-lanceolate or elliptic, with sub-acute apex and cuneate base, the edges crenate serrate or entire; main-nerves a single pair, ascending; length .75 to 1.5 in.; petioles .1 to .3 in. long. *Heads* ovoid-conical, .35 to .5 in. long, on slender peduncles 1 to 2.5 in. long, solitary or in very lax panicles. *Involucral bracts* short, oblong, blunt or sub-acute, 3-nerved. *Ray-florets* minute. *Cypselas* sometimes marginate, scabrid or smooth; pappus of one or two bristles or absent. DC. Prod. V. 623; Prain Bengal Plants, 614; Wall. Cat. 3285; Clarke Comp. Ind. 138; Hook. fl. Fl. Br. Ind. III. 307. *S. calva*, DC. l.c. V. 625; Wight Ic. 1109. *S. pseudo-Acmella*, Linn.; DC. l.c. 625, and in Wight Contrib. 19; Wall. Cat. 3185. *S. oleracea*, Jacq. Hort. Vind II. t. 135; Roxb. Fl. Ind. III. 410, DC. l.c. 624. *Bidens fervida* and *B. fiza*, Lamk. Dict. I. 415, 416. *Cotula conica*, Wall. Cat. 3185. *Verbesina Acmella*, Linn. Sp. Pl. 901. *V. pseudo-Acmella*, Linn. l.c. 901.

MALACCA: Griffith (K.D) 3186; Cuming 2361. PERAK: Scortechini 1400. PENANG: Deschamps.

# 18. SYNEDRELLA, Gaertn.

Annual branched herbs. *Leaves* opposite, petiolate, dentate. *Heads* small, axillary and terminal, heterogamous, rayed. *Involucre* ovoid or



oblong, its bracts few ; the outer one or two foliaceous, passing into the flat scarious pales of the small receptacle. *Ray-florets* few, ♀, ligulate, with short broad 2-3-toothed lamina. *Disk-florets* ♂, tubular, regular, the limb 4-toothed. *Anthers* syngenesious, their bases sub-entire. *Style-arms* of ♂ florets long, acute. *Cypselas* of ray-florets much compressed dorsally, smooth, their edges winged and with long teeth ; those of the ♂ few, narrower, compressed or trigonous often muricate ; pappus in both consisting of 2 (rarely more) bristles.—DISTRIB. Species 2, tropical American, 1 also Asiatic and African.

*SYNEDRELLA NODIFLORA*, Gaertn. Fruct. II. 456, t. 171, f. 7. An erect dichotomous annual with terete wiry glabrous branches thicker than a crow-quill ; all parts more or less scaberulous. *Leaves* membranous, opposite, petiolate, ovate, acute, the base cuneate, the edges serrate or crenate (sometimes obscurely so) ; main-nerves 3 or 4 pairs, the lower pair long and bold, the others short and faint ; both surfaces minutely and sparsely strigose, and greenish when dry ; length .75 to 3 in. ; breadth .3 to 1.25 in. ; petioles .1 to .4 in. often ciliate on the edges. *Heads* .25 in. in diam., axillary, solitary or in small clusters, usually sessile but sometimes on short peduncles, inner bracts of the involucre linear-lanceolate, shining. *Cypselas* of the inner flowers muricate, with 2 unequal hispid pappus hairs longer than themselves and than the corolla ; outer cypselas shorter, broader, smooth, black ; their edges winged, deeply toothed, pale. Hook. Exot. Flora, t. 60, Clarke Comp. Ind. 139 ; Hook. fil. Fl. Br. Ind. III. 308 ; Prain Bengal Plants, 615. *Verbesina nodiflora*, Linn. Amoen. Acad. IV. 290.

Near cultivation, common.

#### 19. *BIDENS*, Linn.

Herbaceous, annual or perennial, sometimes scandent. *Leaves* opposite, entire, irregularly lobed or 1-2-pinnatisect. *Heads* small and corymbose or larger and sub-solitary, heterogamous and rayed. *Ray-florets* in one series, neuter or rarely ♀, fertile, the corolla ligulate, yellow or white, spreading, entire or somewhat toothed. *Disk-florets* ♂, fertile, tube, cylindric, limb shortly 5-fid ; occasionally homogamous from the abortion of the ray-florets. *Involucre* campanulate or sub-hemispheric, its bracts in two series, often slightly connate below ; the outer short herbaceous or long and leafy, the inner membranous ; receptacle flat or convex ; its pales narrow, little concave. *Anthers* entire or bluntly sagittate at the base. *Style* of ♂ florets with arms hirsute upwards and short acute or long apices. *Cypselas* dorsally compressed or somewhat tetragonous, linear or cuneiform, often narrowed but not beaked above ; pappus of 2 to 4 persistent,

retroscely barbellate arms.—DISTRIB. About 120 species, chiefly American.

*BIDENS PILOSA*, Linn. Sp. Pl. 832. An erect, very variable, glabrous pubescent or pilose herb, 6 to 24 in. high; stems when dry 4-angled. *Leaves* 3-fid to 3-partite, or 2-3-pinnatifid, their segments broadly or narrowly ovate to lanceolate, serrate. *Heads* 3 to 4 in. across, on long stout petioles of varying length, terminal or axillary. *Ray-flowers* when present white or yellow, often absent. *Involucral bracts* shorter than the flowers, broadly oblong, with scarious margins. *Cypselas* black, compressed, long, narrow, slender, ribbed; pappus of 3 or 4 bristles shorter than the cypselas, pale brown.

VAR. 1 *pilosa* proper, Hook. fil. Fl. Br. Ind. III. 309; leaves 3-fid or 3-sect, their segments broadly or narrowly ovate or lanceolate, serrate. *B. pilosa*, Linn., DC. Prod. V. 597; Clarke Comp. Ind. 140, Prain Bengal Plants, 616. *B. leucantha*, Willd. *B. chinensis*, Willd., Wall. Cat. 3189 (*in part*). *B. tripartita* and *B. bipinnata*, Wall. Cat. 3187 (*in part*).

VAR. 2 *bipinnata*, Hook. fil. l.c. 309; leaves bipinnately compound, their segments ovate lanceolate or linear, entire lobed or toothed. *B. bipinnata*, Linn., Roxb Fl. Ind. III. 411. *B. chinensis*, Wall. Cat. 3189 (*in part*). *B. Wallachii*, DC. Prod. V. 598

VAR. 3 *decomposita*, Hook. fil. l.c. 310; leaves decompositely pinnatifid, segments linear, slender. *B. decomposita*, Wall. in DC. Prod. V. 602, Cat. 3188; Clarke Comp. Ind. 141 *excl. var. β*

In all the provinces in waste ground near cultivation, but not common.—DISTRIB. In all warm countries.

## 20. TRIDAX, Linn.

A perennial herb. *Leaves* opposite, pinnatisect, with few narrow segments. *Heads* solitary on very long peduncles, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate or bilabiate, the outer lip large 3-fid, the inner small and 2-fid or none. *Disk-florets* ♂, fertile, tubular, the limb elongate and 5-fid. *Involucral bracts* in few series, the outer short broad herbaceous, receptacle flat or convex; its scales membranous. *Antthers* with short acute auricles at their bases. *Style-arms* of the ♂ flowers hairy above, their apices subulate. *Cypselas* oblong or depressed-globose, silky; pappus of unequal aristate feathery bristles of 1.—DISTRIB. 7 species, tropical American, 1 being an introduced herb in the tropics of Asia.

TRIDAX PROCUMBENS, Linn. Sp. Pl. 900. Procumbent, <sup>hispid</sup> ~~hairy~~, with slightly branched stems as thick as a crow-quill. *Leaves* <sup>to</sup> 2 in. long, few, ovate-lanceolate, deeply and irregularly serrate, <sup>5</sup> ~~5~~

*Heads* .4 to .6 in. in diam., on slender erect solitary peduncles 3 to 8 in. long. *Cypselas* brown; pappus shining, white. DC. Prod. V. 679; Wall. Cat. 3197; Clarke Comp. Ind. 142; Hook. fil. Fl. Br. Ind. III. 311; Prain Bengal Plants, 618.

In cultivated and waste places: an introduction.

## 21. CENTIPEDA, Lour.

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, axillary, sessile or racemose, heterogamous, disciform, yellow. *Outer florets* ♀, in many rows, fertile, their corollas minute, obscurely lobed. *Disk-florets* ♂, few, fertile, their corollas with short tube and campanulate 4-fid limb. *Involucre* hemispheric, its bracts in 2 series, spreading in fruit; receptacle naked. *Anthers* obtuse and entire at the base. *Style-arms* of ♂ flower short, truncate. *Cypselas* 4-angled, the apices obtuse, the angles hairy; the hairs sometimes hooked; pappus none.—DISTRIB. 43 species, Asiatic, Australian, and South American.

CENTIPEDA ORBICULARIS, Lour. Fl. Cochinch. III. 493. An annual prostrate herb with numerous thin rooting stems, glabrous or sparsely tomentose. *Leaves* obovate-oblong or cuneate, .2 to .5 in. long, sparsely toothed. *Heads* .1 to .15 in. in diam., globose, solitary, axillary, subsessile. *Florets*, ♀ minute, numerous, tubular, minutely 3-toothed; ♂ 10 to 12, 4-toothed. *Cypselas* with simple hairs. Hook. fil. Fl. Br. Ind. III. 317; Prain Bengal Plants, 620. *C. minuta*, Benth. in Bth. & Hook. fil. Gen. Pl. II. 230; Clarke Comp. Ind. 151. *Myriogyne minuta*, Less.; DC. Prod. VI. 139. *Cotula sternutatoria*, Wall. Cat. 3259. *C. minima*, Willd. Sp. Pl. III. 2170. *Dichrocephala Schmidii*, Wight Ic. 1610. *Artemisia sternutatoria*, Roxb. Fl. Ind. III. 423. *A. minima*, Linn. Sp. Pl. 849. *Sphæromorphæa centipeda*, DC. l.c. 140.

In all the provinces: by the sides of roads in cultivated ground, not common.

## 22. ARTEMISIA, Linn.

Herbs or shrubs, usually fragrant. *Leaves* alternate, 1- to 3-pinnatisect, serrate or entire. *Heads* small, numerous, racemose or paniced, solitary or in fascicles (never corymbose), heterogamous or homogamous, disciform. *Outer florets* ♀, in a single series, fertile, very slender, 2-toothed. *Disk-florets* ♂, fertile or sterile, the limb 5-fid. *Involucre* or l. sub-globose or hemispheric; bracts in few series, the outer shorter, their margins scarious; receptacle flat or convex, naked or hairy. *Anthers* with entire obtuse bases. *Style-arms* of the ♂ florets with truncate, usually penicillate, tips. *Cypselas* very minute, oblong,

ellipsoid or sub-obovoid, faintly striate; pappus none.—DISTRIB. About 240 species in the north temperate regions mostly of the Old World.

*ARTEMISIA VULGARIS*, Linn. Sp. Pl. 848. A small shrub; stems as thick as a goose-quill, brown when dry, sub-glaucous and with sparse white pubescence. *Leaves* membranous, varying much in shape and size, those near the base several inches long, large pinnatifid or bi-pinnatifid, the pinnules oblong, the ultimate lobes entire with sub-aristate apices, leaves of the stem diminishing in size upwards, lacinate, and passing near the apex into simple linear bracts less than 5 in. long; all glabrous on the upper surface and white adpressed-pubescent on the lower. *Heads* about 15 in long, cylindric or narrowly campanulate, sessile, solitary or in small clusters, in axillary sub-second spikes of varying length, the upper part of the stem forming a long spike. *Involucral bracts* only 5 or 6, broadly lanceolate or oblanceolate, the inner scarious. *Corollas* glabrous. DC. Prod. V. 112; Boiss. Fl. Orient. III. 371; Roxb. Fl. Ind. III. 420; Clarke Comp. Ind. 161; Hook. fil. Fl. Br. Ind. III. 325. *A. indica*, Willd.; DC. l.c. 114; Roxb. Fl. Ind. III. 419; Wight Ic. 1112; Wall. Cat. 3293. *A. dubia*, Wall. Cat. 3307; DC. l.c. 110. *A. myriantha*, Wall. Cat. 3297; DC. l.c. 112. *A. paniculata*, Roxb. Fl. Ind. III. 418. *A. leptostachya*, DC. l.c. 113. *A. grata*, Wall. Cat. 3294 (*in part*); DC. l.c. 114. *A. lavandulifolia*, DC. l.c. 110.

In all the provinces, near cultivation, not common and probably introduced.—DISTRIB. Europe, Northern Asia, India, mountains of the Malayan Archipelago.

### 23. CREPIS, Linn.

Annual or perennial herbs, glabrous or hairy, hairs all simple. *Leaves* alternate, radical or cauline, the latter often stem-clasping, entire toothed or pinnatifid. *Heads* pedunculate, solitary, fasciculate or corymbose, yellow or red, homogamous, ligulate. *Involucre* cylindric or campanulate; bracts either multi-seriate and regularly imbricate, or the outer smaller and shorter than the single series of inner, base of midrib often thickened after flowering; receptacle flat, rarely concave, naked or shortly fimbriate. *Corollas* ligulate, with broad 5-toothed apices. *Anthers* syngenesious, their bases sagittate, the auricles acute or shortly setaceous. *Cypselas* more or less fusiform or oblong, rarely short and cylindric, often slender, glabrous or scaberulous, 10- to 20-ribbed, the apex narrowed or beaked; pappus usually copious, short or long, the hairs simple, soft, usually silvery, rarely brownish and stiff or brittle.—DISTRIB. Species about 10, chiefly in the northern regions of the Old World.

*CREPIS JAPONICA*, Benth. Fl. Hongk., 194. Annual; glabrous or puberulous; stems one or more from the same root, 6 to 18 in. high. Radical leaves oblanceolate, runcinate-pinnatifid or sinuately toothed, 1 to 2.5 in. long, usually on petioles .5 to 1.5 in. long; cauline leaves few, much smaller and often sessile. Heads .2 in. long and .3 in. in diam. when expanded, on short, slender pedicels with linear minute bracteoles at their bases, collected at the apices of the long, slender stems in compact or lax corymbose cymes. Involucres shorter than the florets, their bracts in two rows, the outer very short; the inner 6 or 7, narrowly oblong, blunt, with narrow hyaline margins and dark, thickened midribs. *Cypselas* .1 in. long, contracted below the apex, but not beaked, compressed, with many smooth or puberulous ribs, equal to or shorter than the soft, white pappus. Hook. fil. Fl. Br. Ind. III. 395; Prain Bengal Plants, 627. *C. lyrata*, Clarke Comp. Ind. 253. *Youngia lyrata*, Cass., Thw. Enum. Pl. Ceyl. 168. *Youngia Thunbergiana*, *runcinata*, *napiifolia*, *Poosia*, *ambigua*, *fastigiata* and *striata*, DC. Prod. VII. 192, 193. *Y. napiifolia*, Wight Ic. 1147. *Lactuca napiifolia*, DC. in Wight Contrib. 27. *Chondrilla runcinata*, Wall. Cat. 3272. *Prenanthes Poosia* and *napiifolia*, Wall. Cat. 3265, 3277. *P. japonica*, Linn Mant. 107. *P. striata*, Blume Bijdr. 885.

In all the provinces, near or in cultivated ground.

## Order LXII. STYLIDIEÆ.

Herbaceous plants, rarely undershrubs. Leaves radical or scattered or fasciculate on the stem, more or less subverticillate, entire, often small and narrow, no stipules. Flowers in terminal racemes or thyrsoid or corymbose panicles, irregular, perfect, pedicels bracteate. Calyx-tube adnate to the ovary; limb 2-lipped, upper lip 3-, lower 2-flowered. Corolla gamopetalous, 5-lobed, 4 lobes spreading, the fifth (lip) smaller, irregular, the lobes imbricate. Stamens 2, parallel, inserted on a glandular disk surmounting the ovary; filaments connate with the style into a column; anthers sessile on the column, the cells sub-confluent. Ovary inferior, 2-celled; style entire or divided into two stigmas; ovules many in each cell, on axile placentas on the middle of the dissepiment, anatropous. Fruit a 2-celled capsule, sometimes 1-celled by the suppression of the septum, the valves cohering at the base. Seeds minute, numerous, sub-globose; albumen fleshy; testa thin, embryo minute, next the hilum.—DISTRIB. Species about 100, Australian, with a few in tropical Asia, New Zealand, and Antarctic America.

STYLIDIUM, Sw.

Herbs, with the habit leaves and inflorescence of the Order. *Calyx-lobes* 5, bilabiate. *Corolla* irregularly 5-lobed, 4 lobes sub-erect in pairs, the fifth smaller, recurved. *Stamens* in an elongate column, often recurved or reflexed, especially when irritated. *Ovary* 2-celled, stigma entire.—*DISTRIB.* 85 Australian species and 3 Indian or Malaya ♀

STYLIDIUM TENELLUM, Swartz in Gesellsch. Nat. Berl. Mag. 1807, 51. t. 2, fig. 3, *not of Br*. A small erect herb; stem simple, leafy, glabrous, 4 to 8 in. high, dichotomous, compressed. *Leaves* scattered, alternate, oblong or oblong-obovate, lower ones broader 2 to 3 in. long, upper ones narrower, getting gradually smaller upwards and passing gradually into bracts; nerves of lower leaves 3, from the base. *Flowers* sessile, 2 to 5, alternate; bracts minute, linear. *Calyx* bilabiate, upper 3-, lower 2-lobed, lobes linear. *Corolla* irregularly 5-lobed, 4 lobes erect linear, the fifth recurved, spatulate. *Staminal column* exsert, stamens 2, anthers 2-celled, connivent. *Ovary* inferior, elongate, 2-celled, many-seeded, stigma entire. *Capsule* 2-celled, 2-valved, 5 to 7 in long, seeds minute, papillose. DC. Prod. VII. 336; Hook. fil. and Th. in Journ. Linn. Soc. II. 8; Miq. Fl. Ind. Bat. II. 571, Kurz in Flora, 1872, 304. *S. roseum*, Kurz in Journ. As. Soc. Beng. XLV ii 137, XLVI ii 212; Clarke in Hook. f. Fl. Br. Ind. III 420.

PENANG: *Ridley* 7103. PROVINCE WELLESLEY, at Butterworth *G. King*. MALACCA: *Swartz*.—*DISTRIB.* Eastern Bengal and Burma, in Dacca, Chittagong and Mergui.

*S. uliginosum*, Swartz, is recorded in Fl. Br. Ind. as from "MALACCA *sic* H. 1 and T.", as we have seen no specimens, we consider it sufficient to record the fact. In Miq. Fl. Ind. Bat. it is *S. Kunthii*, Wall, that is recorded from Malacca, and it seems more likely that this is right as Griffith obtained it at Mergui.

Order LXIII. GOODENOVIÆ.

Shrubs, undershrubs, but chiefly herbs, juice not milky. *Leaves* alternate or radical, rarely opposite, entire dentate or occasionally pinnatifid; stipules none. *Flowers* hermaphrodite, axillary or in terminal spikes, racemes or panicles, regular or irregular, bracts and bracteoles occasionally present. *Calyx* with the tube adnate to the ovary or free; lobes 5, sometimes very small, sometimes connate in a ring or obsolete. *Corolla* gamopetalous, inserted on the calyx, usually white, yellow or blue, rarely red; lobes 5, valvate, usually induplicate-winged. *Stamens* 5, alternate with the corolla-lobes, inserted on the

disk crowning the ovary; free or connate in a ring around the style; anthers 2-celled, the cells parallel, dehiscing longitudinally and intorsely. *Ovary* 1-2-celled; style simple with a cup-shaped sheath including the stigma; ovules 1 or many in each cell, erect or ascending, rarely pendulous, inserted on the dissepiment or central. *Fruit* an indehiscent drupe or a capsule with 2 or 4 valves usually dehiscing irregularly. *Seeds* albuminous; testa thin crustaceous or thick and hard; embryo erect in the axis of the fleshy albumen, the radicle inferior.—**DISTRIB.** Over 200 species, mostly Australian, a few in New Zealand, Antarctic America, the Pacific Islands, or on the coasts of tropical Asia, Africa, and the West Indies.

### 1. *SCÆVOLA*, Linn.

Herbs, undershrubs or shrubs. *Leaves* simple, alternate, rarely opposite, entire or toothed. *Flowers* axillary, solitary or in dichotomously branched cymes, sessile or pedicellate. *Calyx* with the tube adnate to the ovary, turbinate, ovoid or globose; limb short, annular or 5-lobed, sometimes obsolete. *Corolla* oblique, split to the base behind, lobes sub-equal or the two uppermost shorter, at length digitately patent. *Stamens* free. *Ovary* 2-celled, with solitary erect ovules in each cell, or 1-celled with 1-2 erect ovules; sheath cupular; stigma truncate or divaricately 2-lobed. *Fruit* an indehiscent drupe, exocarp thin or fleshy, endocarp hard and woody rarely crustaceous. *Seeds* solitary, embryo smooth, cotyledons sometimes broader than the inferior radicle.—**DISTRIB.** About 60 species, 2 Asiatic, 8-10 of the Pacific Islands and the coasts of Asia, 1 extending to the coasts of Africa and the West Indies, the rest Australian.

*SCÆVOLA KOENIGII*, Vahl Symb. III. 36 (1794). An evergreen large glabrous shrub with stout stem and branches, soft spongy pith and coarse fibrous wood. *Leaves* alternate, sessile, obovate-oblong, obtuse at apex, decurrent at base, 3 to 6 in. long, about 2 in. broad, entire or obscurely crenate, more or less fleshy when green, membranous when dry, silky pubescent on both sides or somewhat glabrous on the upper surface, tufted hairy in the axils; midrib stout, prominent, broad, main-nerves 10-12 pair, slender, arching upwards and joining near the margin, secondary nerves few slender, reticulations many, indistinct. *Flowers* white, in axillary few-flowered dichotomous pubescent cymes shorter than the leaves; bracts small, subulate, about .1 in. long; common peduncle .5 to .6 in. long; pedicels .1 to .2 in. long; bracteoles 2, similar to the bracts. *Calyx-tube* adnate to the ovary, .2 in. long, densely villous; lobes .2 to .3 in. long, linear-lanceolate or spatulate, ciliate, pubescent, enlarged in fruit. *Corolla-tube* .7 to .8 in.

long, narrow, pubescent without, villous within, lobes valvately induplicate-winged, 25 to 4 in long, lanceolate, prominently veined, villous-hairy within. *Stamens* erect, free, inserted around the ovary-sheath, 75 in long, filaments thin, anthers ovate, intorse, cells parallel, connective produced above with short divergent lobes. *Ovary* 2-celled, crowned with the oblong bifid stigma which is surrounded by a long fringed sheath, ovules 1 in each cell, erect. *Fruit* a 2-celled ovate-globose succulent drupe, 3 to 5 in in diam, depressed above, ribbed, endocarp bony. Lamk III t 124, fig 2 DC Prod VII 505, Hook f and Th in Journ Linn Soc II 8 Hook f Bot Mag t 2732, Blume Bijdr 730, Miq Fl Ind Bat II 580 Kurz in Journ As Soc Beng XLVI n 212, For Fl II 84, Clarke in Hook f Fl Br Ind III 421, Trimen Fl Ceyl III 54, Cooke Bomb Flora, II 69, Benth Fl Austr IV 86 *S. sericea*, Forst, DC lc 506 Blume Bijdr 750, Miq Fl Ind Bat II 581 *S. Taccada*, Roxb Hort Beng 15, Fl Ind I 527, DC lc 505, Dalz and Gibs Bomb Fl 134, Ham in Trans Linn Soc XVII 250 Wall Cat 1314, Wight III t 137 *S. Lobelia*, Ham in Trans Linn Soc XVII 250, De Vriese Goodenov 20-26 and in Ned Kruidk Arch II 20, not of Linn *S. Plumieri*, Blume Bijdr 730, not of Vahl *S. montana*, Lab Seit Austr Caled 41, t 42, DC lc 506 *S. velutina*, Presl in Rel Haenck II 57, DC lc 506 *S. Bela Modagam*, Rœm and Sch Syst V 163, DC lc 505 *S. Leschenaultii*, DC lc 506 *S. macrocalyx* De Vriese Gooden 26, tab 3 figs 1-4 *S. chlorantha* and *S. Lambertiana*, De Vriese, lc 27, 28 *S. latu*, Hance in Walp Ann II 1054 *Lobelia frutescens*, Linn Fl Zeyl 148 *L. Taccada*, Gærtn Fruct I 119, tab 25, fig 5 *L. Plumieri*, Burm Fl Ind 186, not of Linn *Cerbera Salutaris*, Lour Fl Cochinch 136 *Buglossum litorum*, Rumph Herb Amb IV 116 t 51 "*Bela Modagam* Rheede Hort Mal IV t 59

PENANG Wallich 1314 MALACCA Griffith JOHORE Jensen SINGAPORE Sir R Schomburgk 82, G Kuny G Thomson—DISTRIB Sea-shores of India from Sind to Ceylon Burma, Malay Islands and eastwards to Australia and Polynesia

#### Order LXIV CAMPANULACEÆ

Herbs, undershrubs, rarely shrubs, erect or climbing, often with milky juice. *Leaves* alternate or rarely opposite, entire toothed or rarely lobed, no stipules. *Inflorescence* axillary or terminal, flowers solitary, racemose or paniculate, bracts small bracteoles none (present in *Sphenoclea*) *Calyx-tube* adnate to the ovary, limb few- or many



lobed or <sup>4</sup>-partite, lobes usually persistent in fruit, valvate or imbricate in bud. *Corolla* gamopetalous, tubular, rotate or campanulate, superior, sometimes bilabiate; lobes as many as those of the calyx, valvate or induplicate-valvate, sometimes 1, 2, or all free to the base. *Stamens* equal in number to the corolla-lobes and alternate with them; inserted on the epigynous disk or (in *Sphenoclea*) on the corolla-tube; filaments free or connate in a tube; anthers linear, oblong or ovate, free or connate in a tube, 2-celled, the cells parallel, dehiscing longitudinally and introrsely. *Ovary* usually inferior, 2-5- rarely more-celled; placentas axile, many ovuled; style simple, clavate, within the staminal tube; stigma-lobes as many as the ovary-cells; ovules anatropous, erect horizontal or pendulous. *Fruit* capsular or baccate, crowned by the persistent calyx-lobes, dehiscing vertically or laterally, or indehiscent. *Seeds* very many, small, albuminous; testa thin, coriaceous; embryo erect, radicle inferior.—**DISTRIB.** Over 1,000 species, scattered throughout the globe, chiefly in temperate regions.

Tribe I. LOBELIEÆ. Corolla 2-lipped, cleft dorsally to the base; anthers connate.

Fruit a capsule, 2-valved at the summit	..	..	1. LOBELIA.
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Tribe II. CAMPANULÆ. Corolla regular; anthers free or imperfectly connate

Flowers solitary, peduncled	..	..	2 CAMPANULÆ
Flowers in a dense scorpioid spike	..	..	3. PENTAPHRAGMA.
Flowers in a dense cylindric spike	..	..	4. SPHENOCLEA

### 1. LOBELIA, Linn.

Herbs of various sizes, sometimes very small, sometimes erect and very tall; undershrubs or shrubs. *Leaves* alternate, usually toothed. *Inflorescence* either 1-flowered, in the axils of leaves or bracts, or in a terminal leafy raceme; bracteoles very small or none. *Calyx-tube* adnate to the ovary, turbinate, hemispheric, obovoid or rarely oblong-linear; limb 5-partite or 5-fid, lobes often unequal. *Corolla* oblique, 2-lipped; upper lip 2-, lower 3-partite or -lobed. *Staminal tube* free from the corolla or adnate only at the base; anthers with 2 lower tipped with bristles, 3 upper naked, or else all penicillate. *Ovary* inferior, 2-celled; placentas hemispheric; ovules numerous; stigma shortly bifid. *Capsule* loculicidally 2-valved within the calyx-tube. *Seeds* very many, minute, ellipsoid, compressed or trigonous.—**DISTRIB.** About 200 species, throughout the world, though scarce in Europe and Western Asia.

**LOBELIA AFFINIS**, Wall. Cat. 1311. A prostrate often rooting herb with much-branched stem, pubescent or glabrate. *Leaves* ovate-

rotundate, acute at apex, rounded or truncate or cordate and more or less decurrent at base, 5 to 2 in long, 5 to 15 in broad, mucronate-dentate or -crenate, membranous, usually strigosely hairy on the nerves especially beneath, sometimes nearly glabrous, midrib slender, main-nerves 4-6 pairs, petiole 3 to 6 in long, more or less winged by the decurrent margins of the blade, strigosely hairy. *Flowers* single, on slender pedicels about 6 to 1 in long, bracts minute, pedicels usually deflexed in fruit. *Calyx-tube* adnate to the ovary, ribbed, strigose, obconical, lobes 5 linear spreading, 1 to 2 in long, pilose. *Corolla* purple, 2 to 25 in long, 2 upper lobes falcate lanceolate, 3 lower connate, teeth short. *Staminal tube* as long as or longer than corolla, anthers all penicillate. *Ovary* 2 celled, style long, stigma bifid, lobes rounded, recurved, ovules many. *Capsule* ribbed, strigose. *Seed* small, ellipsoid trigonous. DC Prod VII 360, Miq Fl Ind Bat II 574, Hook f and Th in Journ Linn Soc II 27, Clarke in Hook f Fl Br Ind III 424, Tumen Fl Ceyl III 57, Prain Beng Plants I 633. *L. zeylanica*, Wall in Roxb Fl Ind ed Carey and Wall II 113, Kurz in Journ As Soc Beng XLVI n 211, *not of Linn*. *L. subcuneata*, Miq Fl Ind Bat II 574. *L. succulenta* and *L. Heyneana*, Bl Bijdr 728.

PENANG *Ridley* 7162, 10185, *J Scott*. PERAK *Ridley* 2902, *Curtis* 2025, *Scortechini* 309, 344, *King's Collector* 2376. SINGAPORE *Kurz*—DISTRIB Eastern Bengal, Burma, Ceylon, Malay Islands, Southern China.

*Isotoma longiflora*, Presl is an introduced West Indian plant found in shady places. PENANG *Deschamps*. SINGAPORE *Hullett* 29, *Kunstler* 90.

## 2 CAMPANUMÆA, Blume

Perennial erect or climbing herbs with tuberous roots. *Leaves* opposite, petiolate, usually cordate. *Flowers* usually large, solitary peduncled, terminal or axillary on short leafless flowering branches. *Calyx-tube* adnate to the ovary, or below it, persistent, 4- to 6 partite with spreading lobes. *Corolla* broadly campanulate, the base adherent to the calyx tube, 4- to 6-lobed, white, greenish, or lurid-purple in colour. *Stamens* 4-6, inserted round the base of the corolla tube, filaments dilated, anthers free. *Ovary* 4-6-celled, placentas thick, many ovuled, style cylindric, stigma 4-6 cleft with short broad lobes. *Fruit* a berry, sub-globose or with truncate top, indehiscent. *Seeds* very many, small, ellipsoid.—DISTRIB 5-6 species, all of Eastern tropical and sub-tropical and temperate Asia.

CAMPANUMÆA CELEBICA, Blume Bijdr 727. An erect herb reaching 4 to 5 feet in height, with horizontal spreading smooth branches.

*Leaves* ovate-lanceolate, acuminate, rounded at base or cuneate, often unequal, 3 in. long, .75 to 1 in. broad, serrate or almost entire, the serratures mucronate; chartaceous; glabrous above, glaucous and glabrous or with scattered pubescence beneath; midrib slender, main-nerves 4-6 pairs at about 30 degrees with the midrib, arching and joining near the margin; petiole short, .15 to .25 in. long. *Flowers* solitary, terminal or in the forks of a dichotomous cyme; peduncles .3 to .5 in. long, those of terminal flowers shorter; bracts small linear. *Calyx-tube* in bud shortly adnate to the ovary, in fruit often half-way up; teeth .2 to .3 in. long, linear-lanceolate, often serrate. *Corolla* epigynous, shortly campanulate, white or yellowish-white, .3 to .5 in. long; lobes 5, triangular acute. *Stamens* .15 in. long; anthers linear, .05 in. long, filaments dilated. *Ovary* 5-6-celled, style thickened upwards, then cylindric, angled; stigma about 4-cleft. *Berry* .3 to .4 in. in diam., globose, white, slightly succulent, becoming nearly dry, breaking up irregularly. *Seeds* very many, minute, ovoid, flattened, testa smooth. A. DC. Monog. Camp. 120, Prod. VII. 423, Clarke in Hook. f. Fl. Br. Ind. III. 436, Prain Beng. Plants I. 634. *C. truncata*, Endl. Gen. Pl. I. 515. *Codonopsis truncata*, Wall. Cat. 1301; DC l.c. 123; Miq. Fl. Ind. Bat. II. 566. *C. leucocarpa* and *C. celebica*, Miq. l.c. II. 565, 566. *C. albiflora*, Griff. Notul. IV. 279. *Cyclocodon lancifolium*, Kurz in Flora 303; Journ. As. Soc. Beng. XLVI. 210, partly. *C. truncatum*, Hook. f. and Th. in Journ. Linn. Soc. II. 18. *C. adnatus*, Griff.; Benth. in Gen. Pl. II. 558. *Campanula lancifolia*, Roxb. Fl. Ind. I. 505; DC l.c. 485.

PENANG: Curtis 2089. PERAK: Wray 3236, *Scortechini*.—DISTRIB. India from the Sikkim Himalaya to Chittagong and Burma, Malay Islands, Southern China

### 3 PENTAPHRAGMA, Wall

Fleshy perennial herbs, with short, often rooting, little-branched stems. *Leaves* alternate, broad, rounded, sometimes very unequal at the base, petioles rather long. *Inflorescence* of axillary or lateral dense bracteate scorpioid spikes or racemes, the flowers generally in pairs between the bracts. *Calyx-tube* adnate to the ovary; lobes 4-5, superior, obtuse, persistent, unequal in size. *Corolla* campanulate, the tube short, lobes 4-5. *Stamens* 5 alternate with the corolla-lobes, epigynous or on the corolla tube; anthers ovate or oblong, filaments dilated, curved outwards when open. *Ovary* 3-5-celled; style short, cylindric; stigma large, cylindric or conical, obscurely 4-5-lobed; placentas bifid, ovules many. *Fruit* a more or less succulent berry, dehiscence unknown (cf. Roxb. Fl. Ind. I. 506). *Seeds* very many,

small, ellipsoid, testa reticulate-rugose.—DISTRIB. About 7 species, all from the Malay Archipelago and Peninsula

Leaves markedly serrate, very unequal-sided .. .. 1. *P. begoniaefolium*.

Leaves entire or only slightly dentate, nearly or quite equal-sided —

Stem short, flower spikes from upper axils, calyx and corolla usually 5-lobed .. .. 2. *P. Scortechinii*

Stem elongate, flower spikes from lower axils, calyx and corolla usually 4-lobed .. .. 3. *P. Ridleyi*

1. **PENTAPHRAGMA BEGONIEFOLIUM**, Wall. Cat. 1313 A short-stemmed fleshy herb, with flexuose rooting stems and few branches covered with crispate ferruginous woolly hairs. *Leaves* alternate, ovate, the base obliquely excised on one side, cordate on the other, shortly acuminate at apex, 6 to 10 in. long, 4 to 5 in. broad, coarsely serrate, sparsely crispate-villous; midrib thick, near the excised side, main-nerves 1 on the excised side, 4-5 on the other, the nerves again branching outwards; petiole 3 to 1 in long, crispate-villous as are the nerves beneath. *Inflorescence* a short, 1 to 4 in long, scorpioid, shortly peduncled spike, with 2-ranked flowers between ovate membranous bracts 25 in long, axillary in the uppermost leaves, flowers dull yellow supported by an oblong or spatulate villous bracteole 2 in. long, 1 in broad. *Calyx-tube* adnate to the ovary, ovoid, crispate villous, lobes 5 obtuse, rounded, recurved, shorter than the tube, crispate villous without, glabrous within. *Corolla* white, campanulate, 5-lobed, the lobes spreading and recurved, marcescent, oblong obtuse glabrous. *Stamens* 5, free, 1 to 1.25 in. long; anthers oblong, filaments dilated at base. *Ovary* turbinate, 3-celled, ovules many, on axile placentas, style short, stigma cylindrically peltate, obscurely 3-lobed. *Fruit* a berry, dehiscence not known; seeds very many, testa prominently reticulate. DC Prod. VII. 495, Hook f. and Th. in Journ. Linn Soc II. 26; Miq. Fl. Ind. Bat. II. 568, Kurz in Journ. As Soc. Beng. XLVI. ii. 210; Clarke in Hook. f. Fl. Br. Ind III 437, Baillon Hist. des Plantes, VIII. 323, t. 152-154; Schönl. in Engl and Pr. Nat. Pflz.—Fam IV. 5, 60, fig. 37. *Phyteuma begoniaefolium*, Roxb. Hort. Beng. 85, Fl Ind. I. 505, Jack in Hook. Bot Misc I 276, t. 57

PENANG: Wallich 1313; Manngay 2266 (K.D. 712), Stoliczka, Deschamps; Hullett 200; Kunstler 1598. PERAK. *Scortechinii* 336 (part); Wray 3668. SINGAPORE: Lobb.—DISTRIB. Mergui, Griffith A plant of the undergrowth in dense shady forests. Ridley (Trans Linn. Soc. III.) (1893, 315) says that it "grows on rocks along the Tahan River, and also far in the woods, in rocky valleys, common"

2. **PENTAPHRAGMA SCORTECHINII**, n. sp., King & Gamble A

short-stemmed fleshy herb, creeping and rooting below, afterwards erect; branches flexuose, more or less crispately pilose. *Leaves* alternate, ovate or oblong-ovate, blunt or very shortly acuminate at apex, usually cuneately narrowed below and partly decurrent, sometimes slightly excised on one side; 4 to 10 in. long, 2 to 6 in. broad, entire or faintly dentate, margin often recurved, fleshy, glabrous or slightly rough above, crispately pilose and pale beneath; midrib very thick, sometimes slightly to one side, main-nerves about 4 pair, arched upwards and again branched; petiole thick, 2 to 3 in. long, crispately pilose. *Inflorescence* a short, 1 to 2 in. long, scorpioid, very shortly peduncled spike, with 2-ranked flowers between ovate obtuse bracts, axillary either singly or in pairs from the axils of upper leaves, or lateral below them, flowers white with a yellow centre, bracteole wanting. *Calyx-tube* adnate to the ovary, ovoid, villous without; lobes 5, ovate obtuse, unequal in size, 1.5 to 2 in. long, 3-nerved. *Corolla* campanulate, tube short; lobes 5 spreading and recurved, marcescent, glabrous. *Stamens* free, .05 to .1 long, recurved; anthers linear; filaments narrowly winged. *Ovary* turbinate, 3-celled, ovules many immersed in fleshy axile placentas; style short, stigma conical, obscurely lobed. *Fruit* a berry, apparently indehiscent; seeds very many, ellipsoid, papillose-reticulate.

PERAK. *Scortechini* 336; *Wray* 352, 389; *King's Collector* 958, 2653. PAHANG: *Ridley*. Dense forest undergrowth in the hills at 2,000–4,000 feet, in moist places.

VAR *parvifolia*, King & Gamble, a smaller more erect plant, scarcely more than 6 in. high; much less villous, the leaves smaller, oblong, obtuse or slightly acute, 4 in. long and 2 in. broad; the inflorescence shorter and the flowers smaller.

PAHANG, at Salian River: *Ridley*. SINGAPORE, at Bukit Timah *Ridley*.

VAR. *flocculosa*, King & Gamble, leaves ovate rotundate, thick, younger ones densely clothed beneath with crispat villous felt, margins recurved; the main-nerves rarely more than two pairs, all starting from close to the base. *Inflorescence* short, much curved, usually supported by a pair of rounded reduced leaves. *Corolla-lobes* prominently recurved. *Anthers* oblong, cells often divaricate.

PERAK: *Scortechini*. JOHORE, at Goonong Pulau, 1,800 feet: *G King*.

This species is a very variable one, and some forms almost run into *P. begoniaefolium*. Owing to the calyx and corolla being persistent and more or less marcescent, they vary much in size in different flowers on the same plant, and it is difficult to find characters for the varieties, one or both of which may eventually prove to be separate species.

3 *PENTAPHRAGMA* RIDLEYI, n sp., King & Gamble A fleshy herbaceous plant, 10 to 12 in in height, stem 25 in thick, smooth, at first creeping afterwards erect *Leaves* ovate, equal-sided, bluntly acute at apex, cuneate at base, 6 to 8 in long, 3.5 to 4.5 in broad, glabrous on both surfaces, entire or only very minutely dentate on the margin midrib broad, main nerves 4-5 pairs nearly straight slanting upwards, petiole 1 in long *Inflorescence* a short, 1 to 1.5 in long, nearly sessile spike, with 2 ranked flowers between ovate spatulate usually 3 nerved glabrous pale bracts, each flower with a 1.5 in long, linear spatulate, 1 nerved bracteole, ciliate at tip, flowers small 2 to 2.5 in long, *Calyx tube* adnate to the ovary, lobes 4-5 equal or unequal in size, usually 1 in long, 3 nerved, the nerves arching *Corolla tube* short, lobes 4-5, linear oblong, emarginate, recurved, glabrous without, minutely pubescent within, white spotted at base with purple, nerves 3 *Stamens* adnate at base to the corolla tube, .05 to .07 in long anthers club shaped, filaments dilated below *Ovary* turbinate, 3 celled ovules many on axile placentas, stigma rounded, 3-5 lobed, on a very short conical style *Fruit* a berry, conical at top apparently indehiscent seeds rather few and large, testa beautifully reticulate

SINGAPORE *Ridley* 103 —In damp ravines at Bukit Timah (Herb Kew)

#### 4 *SPHENOCLEA*, Gaertn

An annual erect glabrous herb, of marshy places *Leaves* alternate, lanceolate, entire *Flowers* in dense cylindric terminal or leaf opposed peduncled spikes very small, sessile, each with one bract and two bracteoles *Calyx tube* adnate to the ovary, turbinate or hemispherical, lobes 5, sub foliaceous *Corolla* campanulate, 5 lobed, valvate *Stamens* 5, inserted on the base of the corolla, filaments shortly dilated, anthers short, free *Ovary* semi inferior, 2 celled, placentas axile, bearing many ovules style short, stigma obscurely 2 lobed *Capsule* semi inferior, depresso-globose, circumsciss at the margin of the calyx tube, the crown and calyx lobes deciduous *Seeds* very numerous, minute, oblong A single species

*SPHENOCLEA ZEYLANICA* Gaertn *Fruct. I* 113, t 24, fig 5 An erect annual herb, 1 to 2 feet high *Leaves* alternate, lanceolate, narrowed at both ends, 2 to 3 in long, .25 to .1 in broad, entire sessile or shortly petioled, smooth, midrib and main nerves faint *Flowers* in dense, cylindric, terminal or leaf opposed, peduncled spikes, peduncles 5 to 1 in long, spikes 5 to 1.5 in, bract and bracteoles very small *Calyx-tube* adnate to the ovary, turbinate or hemispherical, lobes 5, ovate, .05 to .06 in long, somewhat enlarged in fruit and inflexed over

the disk. *Corolla* campanulate, 5-lobed, .07 to .1 in. long, greenish-white, lobes short, rounded. *Stamens* 5, inserted at the base of the corolla-tube; filaments short dilated; anthers 2-celled, rounded, about as long as filaments. *Ovary* semi-inferior, 2-celled; placentas axile, stalked, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* depressed-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, oblong, minute, scabrous; testa reticulate with rectangular cells Wall. Cat. 1516; Roxb. Fl. Ind. I. 507, Fl. Ind. ed. Carey and Wall. II. 116; Miq. Fl. Ind. Bat. II. 569; Kurz in Journ. As. Soc. Beng. XLVI. ii. 209, Clarke in Hook. f. Fl. Br. Ind. III. 438, Trimen Fl. Ceyl. III. 519; Baillon Hist. des Plantes, VIII. 327, t. 158-161, Cooke Bomb. Flora, II. 75, Prain Beng. Plants I. 635, Schönl. in Engl. and Pr. Pflz.—Fam. IV. 5, 61, fig. 38. *S. Pongatum*, A DC Prod. VII 548, Wight Ill. t. 138. *Pongatum indicum*, Lamk Ill II 444; Encyc. Moth. Bot V. 564. *Gaertnera Pongati*, Retz Obs VI 24 *Rapina herbacea*, Lour. Fl. Cochinch (ed. Willd.) I 157 *Sphenoclea*, Griff Notul. IV. 276. "Pongati," Rheede Hort. Mal. XI 47, t. 24

MALACCA: *Griffith*.—DISTRIB. Swampy places and wet fields, and along river banks in tropical regions of both hemispheres.

### Order LXV VACCINIACEÆ

Shrubs or small trees, often epiphytic, with stems swollen at the base. *Leaves* alternate or in pseudo-whorls, entire dentate or serrate, evergreen, ex-stipulate. *Flowers* in terminal or axillary racemes, or solitary and axillary, hermaphrodite, usually regular; pedicels 1-bracteate and also often with 2 bracteoles, often articulate beneath the ovary. *Calyx* campanulate or cupular, the tube adherent to the ovary, its limb persistent on the fruit, usually 5-toothed. *Corolla* tubular (sometimes inflated), campanulate or globose, 5-toothed or 5-lobed, usually imbricate, deciduous. *Stamens* 10, epigynous, inserted at the base of the corolla-tube; anthers opening by apical pores, or often produced into 2 tubes, opening by slits, filaments flattened, free or connate by their bases. *Ovary* inferior, crowned by an epigynous disk, 5-celled or falsely 10-celled; style cylindric, stigma simple; ovules many (rarely few), the placentas axile or pendulous from the upper inner angle of each cell. *Fruit* baccate, rarely dry, 5- or falsely 10-celled. *Seeds* numerous or few (rarely only 1) in each cell, small, compressed, albuminous. Species about 350, natives chiefly of cold and temperate regions throughout the world.

Corolla long and tubular or campanulate, with long segments —

Calyx tube terete

1 AGAPETES

Calyx tube 5-winged or 5 angled

2 PENTAPTERYGIIUM

Corolla small, campanulate or ovoid its lobes short

3 VACCINIUM

# 1 AGAPETES, D Don

Shrubs, often epiphytic, the stems often much swollen near the base *Leaves* usually coriaceous, alternate, sometimes in pseudo-whorls, from linear to elliptic, entire or toothed, sessile or with short petioles, often glandular near the base *Flowers* axillary, solitary, corymbose or in fascicles the pedicel often thickened or articulate under the ovary, bracts small *Calyx* globose, the limb with 5 persistent teeth or lobes *Corolla* tubular or campanulate, the limb with short or long lobes, red, but often with transverse marks or with greenish white lobes *Stamens* 10, usually with short filaments, *anthers* oblong, each with 2 long apical processes, opening by pores or slits, often spurred behind *Disk* pulvinate, often lobed *Ovary* 5 celled or falsely 10-celled style cylindric stigma capitate, ovules numerous *Berry* globose, nearly dry or succulent, 5 or 10-celled, sometimes opening by pores round the disk within the calyx teeth *Seeds* numerous, ellipsoid, testa lax —DISTRIB 30 species, mostly Himalayan, a few Malayan

AGAPETES GRIFFITHII Clarke in Hook f Fl Br Ind III 449  
An epiphytic shrub, 3 to 15 feet long, with a tuberous stem, young branches half as thick as a goose quill, terete, glabrous *Leaves* thinly coriaceous, oblong lanceolate to ovate lanceolate, always caudate-acuminate, the base rounded both surfaces pale olivaceous-brown when dry, glabrous, minutely reticulate, main nerves 5 or 6 pairs, curved, ascending, faint on both surfaces length 3.5 to 6 in, breadth 1 in to 2.65 in, petiole 1.5 in long or under *Flowers* 3 to 4 in long axillary, always on slender pedicels four or five times as long as themselves, with 1 or 2 narrow bracteoles near the base, glabrous, axillary, solitary, in pairs or in lax racemes *Calyx* 1 to 2 in long (enlarging in fruit), campanulate, with 5 deep spreading triangular lobes *Corolla* 2.5 in long, tubular campanulate, the mouth with 5 triangular sub erect acute lobes *Anthers* inserted at the base of the corolla tube, linear, with 2 long apical beaks dehiscing longitudinally, and 2 posteriorly projecting curved spurs filaments shorter than the anthers, hairy *Fruit* globular, glabrous, crowned by the small inflexed calyx lobes *Seeds* about 20, compressed, tubercled, black

MALACCA Griffith PERAK at elevations of 2,800 to 4,000 feet, Wray 1071, King's Collector 3831, 6363, 8051, Ridley 5532, Scortechini



## 2. PENTAPTERYGIUM, Klotsch.

Shrubs, often epiphytic and with stems much thickened at the base. *Leaves* alternate, ovate or lanceolate, sub-entire or toothed, coriaceous, often with glands at the apex of the petiole. *Flowers* axillary, solitary, fascicled or corymbose; the pedicels thickened near the apex, cupular and jointed under the ovary, bracts small. *Calyx-tube* large, tubular, with 5 wings or prominent angles; its lobes 5, enlarged in fruit. *Corolla* tubular, the mouth with 5 short lobes, coloured red or yellow, and often transversely marked. *Stamens* 10, epigynous, the filaments short; anthers elliptic, produced into 2 long beaks, opening by apical pores or slits, and often spurred behind. *Ovary* 5-celled or spuriously 10-celled, style cylindric, often exserted; stigma sub-capitate, ovules very numerous. *Fruit* baccate, 5-winged or 5-ribbed, 5-celled or spuriously 10-celled. *Seeds* numerous, ellipsoid. —*DISTRIB.* About 6 species, natives of Eastern Himalaya, Khasia, Malay Peninsula.

PENTAPTERYGIUM SCORTECHINII, n sp., King & Gamble. A sarmentose shrub, 4 to 10 feet long, growing on rocks or trees; young branches somewhat thinner than a goose-quill, terete, glabrous, pale brown when dry. *Leaves* thickly coriaceous, ovate to ovate-rotund, the apex blunt or sub-acute, the base broad and rounded but sometimes slightly emarginate, the edges much recurved when dry, upper surface shining, glabrous, pale olivaceous-brown, the lower darker; midrib strong, deeply depressed on the upper surface, prominent on the lower; main-nerves about 4 pairs, spreading, the two lower much the larger, all curved, mostly depressed on the upper surface and prominent on the lower, length 1.75 to 3 in., breadth .8 to 2 in.; petioles .25 to 4 in. *Flowers* 1 in long, few together, in axillary or terminal corymbs; their pedicels about .6 in. long, with 1 or more linear bracts at the base. *Calyx* inflated, tubular, narrowed towards the mouth, glabrous, lobes of the mouth triangular, acute, erect, the lower half of the tube attached to the ovary. *Corolla* inserted on the concave disk of the ovary, slightly exserted from the calyx, tubular, inflated towards the middle; lobes of the mouth short, lanceolate, reflexed, tube with rufous pubescence outside, glabrous within; style cylindric, glabrous, slightly exserted. *Fruit* unknown.

PERAK, at elevations of about 4,500 feet *King's Collector* 8152; *Wray* 210; *Scortechini* 309.

## 3. VACCINIUM, Linn

Shrubs, sometimes epiphytic. *Leaves* usually small, alternate, but sometimes in pseudo-whorls, from lanceolate to ovate, entire or serrate.

*Flowers* usually small, axillary or terminal, in racemes fascicles or corymbs rarely solitary, usually bracteate and bracteolate. *Calyx-tube* globose, its teeth 4 or 5, small. *Corolla* urceolate, tubular or ovoid, 5-lobed, pink white or greenish-yellow. *Stamens* 8 or 10, free, inserted near the base of the corolla-tube; anthers oblong, with two apical cylindric tubes dehiscing by terminal slits, sometimes appendiculate at the base (apical tubes very short in one or two species). *Disk* cushion-shaped, convex, sometimes lobed. *Ovary* 4- or 5-celled, or falsely 8-10-celled; style cylindric, stigma simple; ovules few or several in each cell. *Fruit* a more or less globose berry, crowned by the persistent calyx-lobes, 5-celled or falsely 10-celled. *Seeds* small, 1 or more in each cell, ellipsoid, compressed; testa firm, smooth — **DISTRIB.** Species about 140, in the Northern Hemisphere or on mountain ranges in the tropics.

Leaves broadly elliptic, ovate-rotund or oblanceolate, the apex broad, sometimes minutely apiculate but never acute, very coriaceous. —

Leaves under .75 in. in length, elliptic or obovate-elliptic; corolla 3 in. long, tapering to the mouth; a small glabrous tree or bush. . . . .

1. *V. Scottchani*

Leaves under 1 in. in length, ovate or elliptic; corolla 2 to 25 in. long, the mouth wide, truncate; an epiphytic shrub, glabrous except the scurfy branches. . . . .

2. *V. microphylla*.

Leaves elliptic, their apices sub-obtuse, the base truncate or minutely cordate, 1 to 1.35 in. long; flowers enveloped in large deciduous bracts. . . . .

3. *V. glabrescens*.

Leaves broadly oblanceolate or spatulate, much narrowed to the base. . . . .

4. *V. viscofolium*.

Leaves obovate-elliptic, slightly narrowed to the apex but never acuminate, coriaceous; flowers .35 in. long, in axillary racemes. . . . .

5. *V. Teyemanni*.

Leaves elliptic to elliptic-oblong, sub-acute acute or acuminate: —

Leaves entire: —

Leaves glabrous —

Leaves coriaceous. —

Leaves with 4 or 5 pairs of main-nerves; flowers .2 in long, in axillary and terminal racemes mouth of corolla entire or obscurely toothed; a shrub or small tree; anthers with short broad beaks. . . . .

6. *V. bancanum*.

Leaves with 3 pairs of main-nerves; corolla 2 in long; its mouth with 5 short, broad, recurved lobes; beaks of anthers truncate, shorter than the cells, epiphytic. . . . .

7. *V. Kunstleri*.

Leaves sub-coriaceous, their main-nerves 3 pairs; flowers .35 in. long, beaks of anthers more than twice as long as the cells; epiphytic. . . . .

8. *V. Hasseltii*.

Leaves pubescent or puberulous beneath —

Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate, with very long caudate acuminate apices, under surface pubescent or puberulous ..

9 *V. acuminatissimum*.

Leaves serrate (sometimes faintly so) sub-coriaceous, glabrous, flowers 3 in. long; beaks of anthers twice as long as the cells .. .. .

10. *V. malaccense*.

1 *VACCINIUM SCORTECHINII*, n. sp., King & Gamble. A small tree or large shrub; young branches rather thicker than a crow-quill, dark and much angled when dry, glabrous. *Leaves* small, coriaceous, elliptic or obovate-elliptic, the apex rounded, the base slightly cuneate, the edges much recurved; upper surface olivaceous-brown, shining when dry; the lower brown, dull, faintly reticulate; sparsely scaly; main-nerves a single pair, rarely 2 pairs, curving upwards, converging at their apices, faint on both surfaces, the midrib depressed on the upper surface, prominent on the lower; length 3 to 4.5 in.; breadth .25 to .35 in., petiole very short. *Flowers* about 35 in long, solitary, axillary, their pedicels less than 1 in. long, minutely bracteate at the base, pubescent like the outside of the calyx and corolla. *Calyx* campanulate, the 5 teeth triangular, acute, erect. *Corolla* about 3 in. long, cylindric, inflated below and tapering to the mouth; the lobes short, broad, blunt, erect or reflexed. *Stamens* 10, each with 2 apical truncate beaks shorter than themselves, but no basal processes, filaments longer than the anthers, hairy. *Ovary* with a flat top, 5-celled, each cell with several ovules. *Style* cylindric, nearly as long as the corolla, pubescent in its lower third, otherwise glabrous. *Fruit* globular, crowned by the inflexed calyx-lobes, tomentose, many-seeded, seeds not compressed.

PERAK *Scortechium*, Wray, at elevations of 6,000 and 6,700 feet, 888 and 356, King's Collector 8028.

By the fall of the leaves, in the axils of which they are produced, the flowers appear as if they were in racemes. This closely resembles *V. buxifolium* and *V. coriaceum*, Hook. fil., of which figures are given in Hook. Ic. Pl. t 891 and 892, but this has much narrower flowers and broader leaves than either.

2 *VACCINIUM MICROPHYLLUM*, Blume Bijdr. 851. Epiphytic on tall trees, a small much-branched shrub, young branches as thick as a crow-quill, with small black deciduous scurf. *Leaves* coriaceous, ovate or elliptic, the apex and base blunt, the former sometimes with a minute apiculus; upper surface bright olivaceous and shining when dry, the lower pale-brown and dull, both faintly reticulate when dry; main-nerves usually a single pair, curving upwards from the base of the midrib and passing to near the apex a little inside the edges, depressed like the midrib on the upper surface when dry, but very faint on the lower;

length 5 to 75 in , breadth 3 to 5 in , petioles about 05 in long, hairy  
*Flowers* 2 to 25 in long, axillary, usually solitary, decurved , pedicels  
 05 in long, or less *Calyx* inferior, about 2 in across, flat, deeply  
 divided into 5 broadly triangular, sub-acute, spreading lobes *Corolla*  
 glabrous, widely cylindric-campanulate, deeply cut into 5 broadly  
 triangular acute or sub-acute erect lobes *Stamens* 10, from the base of  
 the corolla , anthers oblong, each with an apical process shorter than  
 itself but with no basal appendage , filaments shorter than the anthers,  
 curved, expanded at the base *Ovary* superior, broad with flat apex  
*Style* cylindric, as long as the corolla , stigma capitate , ovules few in  
 each cell *Fruit* globular, surrounded by and adherent to the calyx,  
 2 in in diam Miq Fl Ind Bat II 1063 *Diplycosia microphylla*,  
 Beccari, Malesia 212, Clarke in Hook f Fl Br Ind III 458

MALACCA *Giffith* (K D) 3484, *Mangay* (K D) 700, *Lobb*  
 PERAK, at elevations of 3,000 feet *Wray* 470, 1105, *Scortechini* 1171,  
*King's Collector* 3660, 6390 KEDAH *Ridley* 5528, 5529 —DISTRIB  
 Borneo, Celebes, Ternate

3 *VACCINIUM GLABRIFRASCENS*, n sp, King & Gamble Epiphytic,  
 young branches rather thicker than a crow-quill, dark-coloured when  
 dry, minutely pubescent *Leaves* coriaceous, elliptic, the apex sub-  
 obtuse, the base sub truncate and minutely cordate , upper surface dark  
 olivaceous brown when dry, reticulate, smooth, shining , lower surface  
 brown when dry, minutely pubescent like the petiole (glabrescent when  
 old) , main-veins 3 or 4 pairs, pinnate, ascending, rather straight,  
 length 1 to 1.35 in , breadth 6 to 1 in , petiole under 1 in long  
*Racemes* solitary, terminal, 3 or 4 times longer than the leaves, bearing  
 at the base of each flower a large lanceolate pubescent deciduous bract  
 4 in long and about 2 in broad at the middle *Fruit* sub-rotund or  
 ellipsoid, baccate, softly and minutely pubescent, crowned by the  
 inflexed triangular calyx teeth, 2 in long and 15 in in diam , 5-celled,  
 each cell with several angled seeds

PERAK *Scortechini* (without number)

4 *VACCINIUM VISCIFOLIUM*, n sp, King & Gamble Young  
 branches half as thick as a goose quill, striate and pale-brown when  
 dry *Leaves* very coriaceous, broadly oblanceolate or spatulate, the  
 apex very blunt, narrowed from below the middle to the short flattened  
 petiole, the edges slightly recurved , upper surface olivaceous when  
 dry, the lower bright brown, both glabrous , main-veins 2 or 3 pairs,  
 originating from the midrib near its base, ascending, little curved, very  
 prominent like the midrib on the upper surface but faint on the lower,  
 length 2 to 2.75 in , breadth 8 to 1.25 in , petioles about 1 in *Racemes*  
 terminal and axillary, often forming, from the fall of the leaves, pseudo-

panicles several times longer than the leaves. *Flowers* not seen. *Fruit* on curved deflexed peduncles, .5 in. in length, globular, baccate, .2 in. in diam., crowned by the persistent disk and by the 5 minute triangular calyx-teeth, 10-celled, the cells with more than one small angled seed.

PERAK : *Scortechini* 405 ; *Wray*, at an elevation of 6,700 feet, 328

VAR *minor*, King & Gamble. Leaves only 1.2 to 1.6 in. in length, their 3 or 4 pairs of nerves not so much from the base of the midrib ; racemes not much longer than the leaves, fruit only .15 in. in diam ; pedicels under .2 in. long.

PERAK, at elevations of 5,000 feet : *Scortechini* 404, *King's Collector* 8020.

5 VACCINIUM TEYSMANNI, Miq. Fl. Ind. Bat II. 1062. A medium-sized tree ; young branches somewhat thinner than a goose-quill, dark-coloured and striate when dry. *Leaves* coriaceous, broadly obovate, often almost rotund-obovate or elliptic, rarely oblanceolate, the apex obtuse or rounded, rarely retuse or sub-acute, the base cuneate and merging in the broad, sometimes glandular petiole ; both surfaces glabrous and faintly reticulate, upper olivaceous when dry, shining, the lower dark-brown, the midrib broad on both ; main-nerves 4 to 6 pairs, curving upwards and anastomosing freely, more prominent on the upper than on the lower surface ; length 2.5 to 3.5 in ; breadth 1.25 to 2.25 in ; petiole .2 to .4 in. long. *Racemes* slender, often longer than the leaves, axillary and extra-axillary, their rachises somewhat compressed and angled, often puberulous ; pedicels slender, curved, minutely bracteolate or ebracteolate at the base, 15 to .2 in. long. *Flowers* .35 in long, their pedicels .15 in. long, decurved or not, puberulous like the outside of the calyx. *Calyx* less than .1 in. long, campanulate, with 5 acutely triangular spreading teeth. *Corolla* white, puberulous, narrowly cylindric, tapering slightly to the mouth ; lobes 5, very short, spreading or reflexed. *Stamens* 8 or 10, included or sub-exserted ; anthers narrowly oblong, with 2 long apical spurs, but without basal appendages, shorter than the tapering hairy filaments. *Ovary* hemispheric, deeply grooved ; style as long as the corolla, grooved, stigmas 5, very short, linear. *Capsule* unknown.

PERAK : On Gunong Bubu, at elevations of 4,500 feet, *Scortechini* 428, 443 ; *Wray* 1117, 3909, *Curtis* 3703.—DISTRIB. Java

6. VACCINIUM BANCANUM, Miq. Fl. Ind. Bat. Suppl 587. A small tree ; young branches twice as thick as a crow-quill, deciduously puberulous, pale and angled when dry. *Leaves* coriaceous, elliptic to elliptic-oblong, the apex sub-acute acute or acuminate, the base

cuneate ; both surfaces yellowish-brown when dry and rather dull, the lower reticulate ; the edges slightly recurved or not ; main-nerves 4 or 5 pairs, ascending, slightly curved, faint on both surfaces ; length 1 to 2·5 in. ; breadth ·5 to ·8 in. ; petioles ·1 in. long. *Racemes* axillary and terminal, twice as long as the leaves, their rachises puberulous, angled when dry. *Flowers* ·2 in. long ; their pedicels slender, decurved, ·1 to ·2 in. long, puberulous, minutely bracteolate at the base. *Calyx* puberulous, cupular, ·15 in. across, deeply divided into 5 triangular sub-acute spreading lobes. *Corolla* ovoid or ovoid-globulose, with truncate, wide, entire, wavy or obscurely toothed mouth, puberulous outside. *Stamens* 10, shorter than the corolla and inserted at its base ; anthers short, broad, with 2 short, trumpet-shaped, curved apical processes, opening by wide pores, and, at the base of these processes behind, 2 curved, slender filamentous spurs ; the filaments longer than the anthers, flattened, tapering from the base upwards, pubescent. *Ovary* depressed, bearing a slightly convex 10-grooved disk and many hairs. *Fruit* 2 to ·25 in. in diam., depressed-globular, crowned by the inflexed calyx-lobes, minutely pubescent, 5-celled, seeds numerous, triangular, reticulate, shining. Clarke in Hook. f. Fl. Br. Ind. III. 454. *V. exaristatum*, Kurz in Journ. As. Soc. Beng., 1873, Pt. II. 96 ; 1877, Pt. II. 215 ; For. Fl. Burm. II. 91

PERAK, at elevations of from 5,000 to 6,500 feet. Wray 328, 1528, 3912 ; King's Collector 7018. MALACCA : Mount Ophir, Moxon, Mairgay (K D.) 699 —DISTRIB. Bangka

7. *VACCINIUM KUNSTLERI*, n. sp., King & Gamble Epiphytic, everywhere glabrous ; young branches one-third of the thickness of a goose-quill, dark and striate when dry. *Leaves* coriaceous, lanceolate or narrowly elliptic, the apex acuminate, the base much narrowed, the edges slightly recurved, both surfaces brown when dry, the upper tinged with olivaceous and reticulate ; main-nerves 3 pairs, ascending, little curved, slightly prominent on the upper surface only ; length 2 to 2·5 in. ; breadth ·5 to ·65 in. ; petioles ·1 to ·15 in. long. *Racemes* about as long as the leaves, axillary, minutely bracteolate at the base of the flowers. *Flowers* ·2 in. long, their puberulous pedicels slender, ·1 to ·15 in. long. *Calyx* cupular-campanulate, about 05 in. long, the limb spreading, wavy, with indistinct broad lobes. *Corolla* tubular-ovoid, ·15 to ·2 in long, the mouth with 5 broad, blunt, short recurved lobes. *Stamens* 10, slightly shorter than the corolla or as long ; anthers small, oblong, each with 2 short, diverging, apical truncate processes, but with none at the base ; filaments three times as long as the anthers, tapering, flattened and hairy below, cylindric above. *Ovary* 5-celled, with several ovules in each cell, depressed, disk slightly convex with radiating

grooves, style slightly exserted, hairy below, stigma small *Fruit* globular, 2 in in diam

PERAK, on Maxwell's Hill, elevation 3,500 feet *Scortechini* 39, 428, *King's Collector* 8415

This closely resembles *V. bancanum*, Miq, but it is an epiphyte. Its leaves, moreover, are narrowly elliptic or lanceolate, and they have only 3 pairs of main nerves. The flowers of this are puberulous and the mouth of the corolla, instead of being entire has 5 broad, short, recurved lobes. The apical processes on the anthers are also of a different shape from those in *V. bancanum*.

8 *VACCINIUM HASSELTII*, Miq Ann Mus Lugd Bat I 40 An erect shrub, young branches twice as thick as a crow quill, dark-coloured and angled when dry, glabrous. *Leaves* elliptic to elliptic-oblong, thinly coriaceous, glabrous, the apex acuminate (often caudately so), upper surface olivaceous brown, the lower paler, main nerves 3 pairs, very slightly curved and erect or ascending, the lower pairs passing almost to the apex, faint but distinct on both surfaces, some of the nerves transverse, the others vertical, length 1.5 to 2.5 in, breadth .6 to 1.25 in, petioles 2 to 2.5 in long, slender. *Racemes* axillary and terminal, usually slightly longer than the leaves, their rachises at first puberulous but ultimately glabrous, bracteolate. *flower* pedicels slender, curved or straight, about 15 in long. *Calyx* shortly cupular, with 5 spreading, broad, sub acute or blunt teeth. *Corolla* about 35 in long, sub cylindrical, narrowing upwards to the mouth, the lobes 5, broad, blunt, erect or reflexed, very short, each bearing a small tuft of hairs. *Stamens* 10, as long as the corolla, anthers oblong, with 2 apical beaks more than twice as long as themselves but with no basal appendages, the filaments shorter than the beaks but longer than the anther-cells, broad and hairy at the base. *Ovary* much compressed, surmounted by a large, much corrugated disk, style as long as the corolla, tapering, boldly ridged. *Fruit* globular, smooth, glabrous, 3 in in diam, crowned by the minute calyx lobes. *V. bancanum*, Miq, var *angustifolium*, Scheff

PERAK *King's Collector* 7515, *Derry* 3702, *Wray* 4012 PAHANG *Ridley* 1363, 10895 JOHORE *Ridley* 6316, 6323 SINGAPORE *Ridley* 3030, 6316a, 8907 —DISTRIB. Bangka

9 *VACCINIUM ACUMINATISSIMUM*, Miq Ann Mus Lugd Bat I 36 Epiphytic shrub, 3 to 8 feet long, young branches half as thick as a goose-quill or less, clothed with short cinereous pubescence. *Leaves* coriaceous, oblong-lanceolate to elliptic-lanceolate, the apex caudate-acuminate, the base cuneate, the edges when dry much recurved, both surfaces dark olivaceous-brown when dry. the upper

shining, faintly and minutely reticulate, glabrous except the puberulous midrib, lower surface dull, dark cinereous-puberulous, especially on the midrib and nerves; main-nerves 4 or 5 pairs, unequal, slightly curved, ascending, the second lowest pair much larger than the others and more erect, all (like the midrib) depressed on the upper surface and bold and prominent on the lower; length 3·5 to 5 in.; breadth 1 in. to 1·75 in.; petioles ·15 in. long, pubescent and with several short hispid axillary processes at their bases. *Racemes* axillary, shorter than the leaves, slender, pubescent; flower-pedicels ·1 in. long, pubescent like the calyx, minutely bracteate at the base. *Calyx* when nearly ripe ·15 in. in diam, with an ovoid-globular tube pubescent outside, the mouth with 5 triangular acute incurved lobes. *Corolla* not seen. *Seeds* several, compressed, black, pitted. *Ericacea*, Wall. Cat. 7528

PERAK, at elevations of from 5,000 to 6,000 feet: *Wray* 1159, 1418, 2821; *Scortechini* 472, *King's Collector* 3509, 6734, 7810 SINGAPORE: *Ridley* 6235.—DISTRIB. Sumatra (*Beccari* 516), Java, Borneo.

10. *VACCINIUM MALACCENSE*, Wight in Calc. Journ. Nat. Hist VIII. (1847) 172 An erect shrub; all parts except the inflorescence glabrous; young branches as thick as a crow-quill, angled, brown when dry. *Leaves* coriaceous, lanceolate or elliptic, the apex acuminate, the base cuneate or acuminate, the edges finely crenate-serrate; both surfaces brown when dry, the lower the paler; main-nerves 4 or 5 pairs, slightly curved, ascending, interarching within the edge, not prominent on either surface, length 1 to 2·25 in., breadth ·6 to ·9 in.; petioles ·1 to ·15 in. long. *Racemes* axillary and terminal, longer than the leaves, many-flowered, puberulous like the pedicels and flowers; pedicels slender, curved downwards, ·15 in. long (lengthening in fruit), each with 1 concave, lanceolate, caducous bract at its base, and 1 or 2 smaller subulate bracteoles inside it. *Flowers* ·3 in. long. *Calyx* campanulate, under ·1 in long, its lobes narrowly triangular, acuminate, spreading. *Corolla* ovoid-cylindric, slightly narrowed to the mouth; lobes of limb very short, reflexed. *Stamens* 10, shorter than the corolla; anthers with 2 apical beaks longer than themselves but with no basal processes; filaments longer than the anthers, bulbous and hairy at the base. *Ovary* depressed, the disk thick; style cylindric, ridged, a little shorter than the corolla. *Fruit* depressed-globose, glabrous, ·35 in. broad. Wight Ic. 1186; Miq. Fl. Ind. Bat. Suppl. 587; Clarke in Hook. f. Fl. Br. Ind. III. 454. *Epigynium malaccense*, Klotzsch in Linnaea, XXIV. 50.

MALACCA: *Griffith* (K.D.) 3458/1; *Maingay* (K.D.) 698; *Lobb*. SINGAPORE: *Ridley*. PAHANG: *Ridley* 1025. PERAK: *Ridley* 3605.—DISTRIB. Bangka, Java, Cochin-China.



## Order LXVI ERICACEÆ

Shrubs, trees, or perennial herbs *Leaves* alternate or in pseudo-whorls, ex stipulate, entire or serrate *Flowers* in racemes or fascicles or solitary, pedicels bracteate and sometimes bi bracteolate *Flowers* regular or (in *Rhododendron*) slightly irregular, hermaphrodite, sometimes dimorphous *Calyx* free or (in *Diplycosia*) sometimes adnate to the ovary, with 5 rarely 4 or 6, teeth or lobes *Corolla* hypogynous, persistent or deciduous, campanulate cylindric or urceolate, with 4 or 5 (rarely 6 to 10) imbricate or contorted, rarely valvate teeth or lobes (polypetalous in *Pyrola*) *Stamens* hypogynous or slightly attached to the base of the corolla, 10 or sometimes 5, 8, or 20 (in *Diplycosia* sometimes epigynous) filaments free or united into a tube by their bases, anthers 2 celled basi or dorsi fixed, dehiscing by apical pores or slits, the cells often prolonged into apical tubes, sometimes dorsally spurred *Disk* various annular or convex, crenate or lobed, sometimes absent *Ovary* 5 celled (rarely 4 to 16 celled), style slender, cylindric, stigma capitate or plane entire or shortly lobed *Ovules* numerous, rarely few, on placentas in the inner angles of the cells or pendulous from the upper corner *Fruit* capsular, 5 celled, many seeded, sometimes appearing baccate from the adherence of the enlarged succulent calyx *Seeds* many small, angled or compressed albuminous, the testa often loose — **DISTRIB** About 1,200, in all parts of the world

**Fruit capsular** —

**Capsule** 5 valved loculicidal

**Calyx** surrounding the capsule succulent in fruit —

**Anthers** with 2 horns at the apex

1 GAULTHERIA

**Anthers** not horned on the apex

2 DIPLYCOSIA

**Calyx** not succulent in fruit

3 PIERIS

**Capsule** 5 to 20 celled septicidal calyx not succulent in fruit,

**anthers** dehiscing by pores

4 RHODODENDRON

**Fruit** baccate

5 PERNETTIOPSIS

## 1 GAULTHERIA, Linn

Erect or procumbent shrubs rarely epiphytic *Leaves* coriaceous, persistent, alternate, serrate or serrulate, pinnately serrate *Flowers* small, occasionally dimorphic, in axillary or terminal racemes, or axillary and solitary, bracteate and bi bracteolate *Calyx* with 5 teeth or lobes, enlarged, succulent and coloured in fruit and enclosing the capsule, and often with 2 simple or connate bracteoles at its base *Corolla* ovoid-

tubular or campanulate, greenish-white or reddish, the mouth with 5 spreading or recurved imbricate lobes. *Stamens* 10, included, attached to the base of the corolla; anthers produced at the apex into 2 tubes, and often also with 1 or 2 dorsal spurs; filaments dilated at the base, usually pilose (in some flowers the stamens small and the anthers without appendages). *Ovary* 5-celled, sometimes 5-lobed; style cylindric; stigma simple; ovules many in each cell. *Capsule* 5-celled, dehiscent loculicidally from the apex, enveloped in the succulent calyx; seeds many, minute, sub-globose, angled.—*DISTRIB.* Species about 80, mostly American, a few in the mountains of India and Malaya, a few also in Australia and New Zealand.

Leaves elliptic or oblong-elliptic, sub-acute	.	..	1. <i>G. fragrantissima</i> .
Leaves broadly ovate, caudate-acuminate	..	..	2. <i>G. leucocarpa</i> .

1. *GAULTHERIA FRAGRANTISSIMA*, Wall. in As. Research. XIII. 397, with figure. A shrub; young branches twice as thick as a crow-quill, 3-angled, glabrous, pale brown when dry. *Leaves* thickly coriaceous, elliptic or oblong-elliptic, sub-acute, the base cuneate, the edges crenate-serrate; both surfaces pale brown when dry and dull, strongly reticulate, the upper always glabrous, the lower with sparse black scales and occasionally a few scattered hairs; length 1·5 to 2·25 in.; breadth ·75 to 1·2 in.; petioles 15 to ·2 in. *Racemes* axillary, usually longer than the leaves, slender, many-flowered; pedicels ·15 in. long, deflexed, each with a small triangular acute bract at its base and two broader connate ones above its middle. *Flowers* ·2 in. long. *Calyx* campanulate, with 5 deep triangular lobes, puberulous, ·05 in. long or less at first, persistent and increasing to ·2 in. with age. *Corolla* ·15 in. long, widely tubular, the mouth contracted and with 5 short blunt lobes. *Stamens* 10, anthers elongate, included, the apex with 2 deeply bifid apical horns; filaments flattened at the base. *Fruit* depressed-globular, with 5 deep grooves, ·15 in. in diam., minutely pubescent, crowned by the long, persistent, slightly clavate, cylindric style, many-seeded. DC. Prod. VII. 593; Wall. Cat. 765, Wight Ic. 1196; Bot. Mag. t. 5984; Clarke in Hook. f. Fl. Br. Ind. III. 457. *G. fragrans*, Don Prod. 151. *G. punctata*, Blume Bijdr. 850; DC. l.c. 593; Miq. Fl. Ind. Bat. II. 1055; Kurz in Journ. As. Soc. Beng., 1877, II. 215, For. Fl. Burm. II. 92. *G. ovalifolia*, Wall. Cat. 1523. *G. Leschenaultii*, DC. l.c. 593; Wight Ill. t. 141c, and Ic. 1195. *Andromeda flexuosa*, Moon Cat. Pl. Ceyl. 35. *A. katagherensis*, Hook. Ic. Pl. t. 246. *Leucothoe* (?) *katagherensis*, DC. l.c. 606.

PERAK, on the summit of Gunong Batu Pateh: Wray 879, 1580; *Scortechini* 405 (in part).—*DISTRIB.* British India, Ceylon, Sumatra, Java.

2. *GAULTHERIA LEUCOCARPA*, Blume Bijdr. 856. A slender climber; young branches as thick as a crow-quill, smooth, glabrous, pale-brown when dry. *Leaves* thinly coriaceous, broadly ovate, shortly rather abruptly and sharply caudate-acuminate, the base broad, emarginate or sub-cordate; edges minutely crenate-serrate; upper surface olivaceous-brown when dry, much and boldly reticulate, the nerves minutely hairy; lower surface pale-brown, reticulate, glabrous; main-nerves 2 to 4 pairs, much curved, ascending, distinct on both surfaces; length 2 to 4 in.; breadth 1 to 2 in.; petioles .15 to .2 in. long. *Racemes* slightly supra-axillary, shorter than the leaves, their rachises compressed, glabrous or pubescent, flower-pedicels rather less than .1 in. long in flower, twice as long in fruit, each with a small ovate concave bract at its base. *Flowers* .3 in. long; their pedicels rather more than .1 in. long, deflexed, puberulous, ebracteolate. *Calyx* less than .1 in. long, puberulous, campanulate, with 5 small spreading sub-acute triangular lobes. *Corolla* sub-cylindric, widest at the base and gradually tapering to the mouth, teeth of the mouth very short, blunt, erect. *Stamens* 10; anthers linear, beaked, shorter than the densely hairy tapering filaments. *Ovary* inferior, depressed-hemispheric, crowned by a thick, very concave, marginally grooved disk; style cylindric, tapering to the apex, glabrous. *Fruit* closely adnate to the calyx-tube, 5-celled, many-seeded. Miq. Fl. Ind. Bat. II 1056; Beccari Malesia, I 213.

PERAK, at elevations of 5,000 to 6,700 feet: *Wray* 360, 1573, 4101; *Scortechum* 1348; *King's Collector* 8025.—DISTRIB. Java, Sumatra.

## 2. DIPLYCOSIA, Blume.

Epiphytic shrubs, glabrous or setose, evergreen. *Leaves* coriaceous, alternate, entire or ciliate-serrate. *Flowers* small, axillary, solitary, on pedicels bracteolate at the base. *Calyx* with 5 teeth or lobes, free or half superior, accrescent in fruit, with 2 basal bracteoles connate into a calyculus. *Corolla* campanulate or urceolate, with 5 slightly imbricate recurved lobes. *Stamens* 10, as long as the corolla, and inserted at its base, quite included or with the tips of the anthers exerted; anthers elongate, oblong, produced at the apex into two straight valvularly-dehiscing tubes, but without dorsal appendages. *Disk* cupular, 10-lobed. *Ovary* 5-celled; style filiform; stigma simple; ovules in the cells numerous, attached to axile placentas. *Fruit* superior or half-superior, included in the succulent accrescent calyx, 2-celled, dehiscing by 5 valves, many-seeded. *Seeds* minute, cuneate; testa lax, reticulate; albumen fleshy; embryo axile, cylindric.—DISTRIB. Species about 14, all Indian or Malayan.

Leaves 2 to 5 in long:—

Calyx-lobes broad, blunt .. ..	1. <i>D. latifolia</i> .
Calyx-lobes triangular, acute .. ..	2. <i>D. heterophylla</i> .
Leaves 1·5 to 2 in. long .. ..	3. <i>D. erythrina</i> .

1. *DIPLYCOSIA LATIFOLIA*, Blume Bijdr. 858. A small glabrous epiphytic shrub; young branches half as thick as a goose-quill, pale and angled when dry. *Leaves* thickly coriaceous, elliptic, the apex shortly and obtusely acuminate, the base cuneate or somewhat rounded, the edges recurved; both surfaces pale yellowish-brown when dry, the upper shining, the lower dull, the midrib bold, much raised on the lower surface, slightly depressed on the upper, main-nerves 2 or 3 pairs, curving upwards, the lower pair usually longer than the others, none of them very prominent on either surface, but more so on the lower than on the upper, reticulations obsolete, length 3 to 5 in.; breadth 1·35 to 3 in.; petioles ·2 to ·3 in. long. *Flowers* ·2 in. long, in axillary fascicles of 3 or 4; their pedicels slender, ·1 to ·15 in. long, inserted 3 or 4 together on minute tubercles surrounded by several small bracts. *Calyx* cupular, ·1 in. across, with 5 broad, spreading, obtuse, ciliolate lobes. *Corolla* ·25 in. long, narrowly campanulate, contracted into a short tube at the base, the limb deeply divided into 5 ovate sub acute lobes, closely embracing the ovary. *Stamens* 10, included, anthers narrowly oblong, each with two short apical truncate beaks but no basal processes; the filaments slender in their upper halves, the lower halves dilated and cohering into a tube. *Ovary* 5-celled, the apex broad, concave; style cylindric, about as long as the corolla, stigma small, capitate. *Fruit* 5-celled; seeds numerous, elongate, black, closely enveloped by the persistent corolla. Miq Fl. Ind. Bat. II. 1055.

PERAK, at elevations of 6,700 feet Wray 364, 909. 2204; *Scortechini* 339; *King's Collector* 6797, 8023. SELANGOR: *Rudley* 7556.—  
DISTRIB. Java.

2. *DIPLYCOSIA HETEROPHYLLA*, Blume Bijdr. 858. A shrub; young branches as thick as a crow-quill, coarsely rusty-pilose at first, afterwards sub-glabrous, when dry pale and angled. *Leaves* coriaceous, elliptic oblong-elliptic or lanceolate, acute or acuminate at apex and base, the edges recurved; both surfaces olivaceous-brown when dry, the upper sub-reticulate and shining, the lower dull and not reticulate; main-nerves 1 pair following the edge from base to apex, distinct and depressed like the midrib on the upper surface, indistinct on the lower; length 2 to 4 in.; breadth 1 to 2 in., petiole rather more than 2 in. long. *Flowers* axillary, fascicled, rarely solitary, about ·15 in. long, bearing under the calyx 2 broadly reniform, acute, spreading concave bracts.

*Calyx* campanulate, with 5 broadly triangular erect lobes, closely applied to the fruit *Corolla* widely campanulate, 2 in long, the teeth 5, broad, blunt, short, reflexed *Fruit* superior, sub-rotund, smooth, many seeded, crowned by the fluted style, seeds oblong, concave, compressed, numerous

PERAK *Scortechini*

3 *DIPLYCOSIA ERYTHRINA*, King & Gamble A small tree, 10 to 20 feet high, young branches twice as thick as a crow-quill, glabrous, pale brown when dry, angled *Leaves* thickly coriaceous, elliptic, the apex obtuse or sub-acute, the base acute, the edges recurved, both surfaces when dry pale brown, the upper tinged with olivaceous, not reticulate, quite glabrous, main nerves 2 to 3 pairs, ascending, rather straight, faint on both surfaces, length 1.5 to 2 in, breadth .75 to 1 in, petioles 1 in long, stout *Racemes* terminal, nearly twice as long as the leaves, with a large narrowly elliptic leaf like bract 4 to 6 in long, and 1 to 2 in broad at the base of each flower pedicel, pedicels decurved, 1.5 in long in the flower, rather more than twice as long in the fruit *Flowers* 4 in long *Calyx* 2 in long, campanulate, with 5 spreading triangular acute lobes *Corolla* .35 in long, cylindric, narrowed towards the throat, glabrous, the mouth with 5 short, broad, blunt, recurved lobes *Stamens* 10, slightly exerted, anthers broadly oblong, with neither apical nor basal appendages, the filaments three times as long, broadening towards the base, pubescent *Ovary* inferior, its disk convex, hairy, style slightly exceeding the corolla, cylindric, stigma small, capitate *Fruit* oblong-globose, 2 in in diam, surmounted by the inflexed calyx lobes, sub glabrous, pericarp leathery, cells 5, each with several angular seeds *Vaccinium erythrinum*, Hook. Bot Mag t 4688

PERAK, at elevations of 5,000 feet Wray 3816, King's Collector 7349, *Scortechini* —DISTRIB Java, Sumatra

3 *PIERIS*, D Don

Trees or shrubs, with terete branchlets *Leaves* alternate, petiolate, entire or serrulate, persistent *Racemes* axillary and solitary, or terminal and in panicles, pedicels bracteate and also with 1 or 2 bracteoles *Calyx* free, with 5 teeth or lobes, the segments in bud open or valvate *Corolla* ovoid or elongate urceolate, with 5 short recurved teeth, white *Stamens* 10, anther cells ovoid-truncate, filaments each with 2 divaricate horns from its apex or ex-appendiculate *Ovary* globose with a lobed disk, 5 celled, ovules numerous, style cylindric, stigma capitate or truncate *Capsule* globose, dry, 5-celled, with 5-valved loculicidal dehiscence *Seeds* many, linear-oblong, falcate, not

winged, albuminous; testa loose.—DISTRIB. Species 10; Himalaya and the mountains of Burma and of the Malayan Peninsula.

*PIERIS OVALIFOLIA*, D. Don in Edinb. Phil. Journ. XVII. (1834) 159. A tree; young branches whitish-puberulous at first, afterwards black and glabrous, about a third as thick as a goose-quill. *Leaves* thinly coriaceous, ovate, shortly acuminate, the base broad and rounded, the edges very slightly recurved; upper surface blackish-brown when dry, glabrous, the lower of a paler brown, minutely reticulate, puberulous on the midrib and nerves; main-nerves 12 to 15 pairs, spreading, curving slightly upwards, sharply prominent on the lower surface, indistinct on the upper; length 4 to 5.25 in.; breadth 2 to 2.75 in.; petiole .25 to .3 in. long, puberulous. *Racemes* simple, axillary, 4 to 10 in. long, sometimes by suppression of the leaves forming a terminal false panicle, more or less pubescent; bracts .2 in. long, linear or lanceolate. *Calyx-teeth* connate at the base. *Corolla* narrowly ovoid, white. *Capsule* globose, glabrous, .2 in. in diam. *Seeds* small, linear-oblong. DC. Prod. VII. 599; Loudon, Arb. Brit. fig. 1070; Clarke in Hook. f. Fl. Br. Ind. III. 460. *Andromeda* or Cat. 763, and in Asiat. Research, XIII. 391 (with fig.); 148, Wight Ic. t. 1199; Brandis For. Flora, 280; Kurz in Jo. Soc. Beng., 1877, Pt. II. 216, For. Fl. Burm. II. 192. *A. ellipt.* Sieb. & Zucc. Fl. Jap. Fam. Nat. II. 126. *Thibaudia*, Griff. Ic. Pl. Asiat. t. 514.

PERAK, at an elevation of 5,000 feet: Wray 1522 —DISTRIB. Himalaya up to 8,000 ft.; Khasia Hills; Burma, Japan.

#### 4. RHODODENDRON, Linn.

Shrubs or trees, often aromatic often scaly. *Leaves* coriaceous, entire, alternate, rarely sub-opposite or in false whorls, often clustered near the ends of the branches. *Flowers* in terminal fascicles or pseudocorymbs, rarely solitary or axillary, bracts broad, usually caducous, bracteoles linear. *Calyx* persistent, 5-lobed, rarely cupular, sometimes small or obsolete. *Corolla* campanulate, salver-shaped or funnel-shaped, the tube long or short, the limb 5- to 10-lobed. *Stamens* usually 10 but sometimes 5 or 18, anthers oblong, dehiscing by terminal pores. *Ovary* 5- to 20-celled; style long or short, filiform; stigma capitate; ovules numerous in each cell. *Capsule* short or elongate, always woody, 5- to 20-celled, septicidally dehiscent, the valves separating from the placentas from above downwards. *Seeds* numerous, ellipsoid, albuminous, the testa often crested or tailed at one end or at both. —DISTRIB. Species about 160, in mountainous parts of Europe, Asia, and North America.

Corolla widely campanulate, tubular only at the base:—

All parts glabrous, leaves not glaucous and without scales;

capsule 1 to 1·5 in long .. .. . 1. *R. javanicum*.

Lower surfaces of leaves glaucous, the nerves and reticulations hairy; capsule 5 in. long .. .. . 2. *R. Wrayi*.

Corolla narrowly campanulate or funnel-shaped, the tube inflated upwards and passing gradually into the limb; flowers

·35 to ·85 in. long.—

Leaves obovate, ·6 to 8 in., and rarely as much as 1 in. long.—

All parts glabrous except the inflorescence .. .. . 3. *R. pauciflorum*.

All parts more or less scaly .. .. . 4. *R. perakense*.

Leaves elliptic to elliptic-rotund, from 1·25 to 2 in. long .. .. . 5. *R. Scortechinii*.

Corolla salver-shaped, the tube much longer than the limb:—

Tube of corolla from 1·25 to 1·6 in. long, and about ·15 in. in diam from base to apex. leaves sub-sessile, whorled, sparsely scaly or glabrous .. .. . 6. *R. jasminiflorum*.

Tube of corolla 2 in. long, 25 in wide near the base, widening to 4 in. or more near the mouth, petioles 35 to 5 in long .. .. . 7. *R. longiflorum*.

Tube of corolla ·6 in. long and about 2 in. in diam; petioles ·4 to 6 in long .. .. . 8. *R. malayanum*.

Species imperfectly known .. .. . 9. *R. dubium*

1. RHODODENDRON JAVANICUM, Benn. Pl Jav. Rar. p 85, t. 19. An epiphytic shrub, 3 to 8 feet long, all parts glabrous, esquamose, young branches rather thinner than a goose-quill. *Leaves* thinly coriaceous, elliptic or elliptic-oblong, tapering to the acute apex and base; both surfaces brown when dry (the lower rather the lighter), shining, the midrib very prominent; main-nerves about 8 or 10 pairs, interarching rather far from the edge, faint on the upper surface, obsolete on the lower, the intermediate nerves almost as prominent; length 3·5 to 5·5 in.; breadth 1·25 to 2 in., petioles 3 to ·75 in. long. *Umbels* terminal, 5- to 7-flowered, enveloped in bud in broadly ovate apiculate bracts; pedicels ·5 to 1·5 in.; bracteoles linear. *Calyx* cupular, less than ·1 in. deep, the mouth wavy. *Corolla* red, widely campanulate, 1·25 to 1·5 in. long; the tube widely funnel-shaped, cylindric at the base; the limb 1·25 to 1·5 in. wide, with 5 large, broad, blunt spreading lobes. *Stamens* 10, shorter than the corolla-limb, the filaments slender; the anthers oblong. *Ovary* glabrous or slightly scaly (hairy in var. *Teysmanni*); style shorter than the stamens, clavate, hemispheric. *Capsule* narrowly cylindric, 1 to 1·5 in. long, and only 25 in. in diam., glabrous, slightly ridged, crowned by the whole or part of the style. DC. Prod. VII. 721; Bot. Mag. t. 4366; Fl. des Serres (1847), t. 293; Miq. Fl. Ind. Bat. II. 1057; Miq. in Ann. Mus. Lugd. Bat. I. 42, t. 1B; Clarke in Hook. f. Fl. Br. Ind. III. 463. *Vireya javanica*, Blume Bijdr. II. 854.

MALAY PENINSULA: Lobb and others. PENANG: Ridley 129.

KEDAH Derry 5531 PERAK *Scortechium* 373, 1325, Derry 3705, Fox 129, King's Collector 2335, 3672, 6916, 7008, Wray 1023 SINGAPORE. Ridley —DISTRIB Sumatra, Java, Celebes

VAR *Teysmannii*, King & Gamble Ovary densely hairy, filaments hairy near the base, corolla yellow R *Teysmannii*, Miq Fl. Ind Bat Suppl 585, Clarke in Hook f Fl Br Ind III 463

PENANG *Mangay* (K D) 1099, 10257, Curtis 530 PERAK Wray 601, 623, King's Collector 3672 —DISTRIB Sumatra, Java

2 RHODODENDRON WRAYI, n sp, King & Gamble A bush, young branches as thick as a goose quill, at first sparsely scaly, ultimately glabrous Leaves very coriaceous, elliptic or sub obovate elliptic, the apex sub acute, the base rounded, the edges recurved when dry, upper surface dark brown when dry, glabrous, the midrib much depressed, lower surface white glaucous, with short hairs on the minute reticulations, the main nerves, and the bold midrib, main-nerves 6 to 12 pairs spreading curved, rather dark-coloured and conspicuous on the lower surface invisible on the upper, length 1.75 to 3.5 in, breadth .85 to 1.5 in petioles 4 to 8 in long, stout, scaly Umbels terminal, 8 to 12 flowered, unequal, 5 to 7.5 in long, scaly Flower buds enveloped in obovate oblong apiculate bracts, the inner tomentose externally, the outer glabrous, all deciduous Calyx cupular, 5 toothed, less than 1 in deep Corolla glabrous, white, tinged with pale pink and spotted in the throat, widely campanulate from a tubular base about 1.25 in long, and rather more in breadth at the mouth, lobes of the limb 5, broadly ovate, spreading Stamens 10, filaments shorter than the corolla, glabrous, anthers oblong Ovary hairy, style glabrous, longer than the stamens stigma hemispheric, lobed Capsule only 5 in long and about half as much in diam, not apiculate, tomentose ridged, 5 celled

PERAK, at from 3,500 to 7,000 feet Wray 322, 886, 1569, *Scortechium*

3 RHODODENDRON PAUCIFLORUM, n sp, King & Gamble A small shrub, all parts except the inflorescence glabrous, young branches as thick as a crow quill, smooth Leaves coriaceous, obovate, rarely rotund obovate, the apex broad, usually minutely retuse, the base much narrowed, the edges recurved, upper surface olivaceous, the lower brown when dry, the midrib stout and prominent on the lower surface, depressed on the upper (when dry), main-nerves 3 or 4 pairs, distinct on both surfaces, length 6 to 1 in, breadth .4 to .65 in, petioles less than 1 in long Flowers 1 or 2, terminal, their pedicels pubescent, 2.5 to 6 in long, with 1 or 2 loose sheathing deciduous bracts at their bases Calyx cupular, about 1 in long, obscurely toothed Corolla



bright red, infundibuliform-campanulate, .2 to .3 in. wide at the throat and from .5 to .85 in. long; the limb spreading, .5 to .75 in. across, divided into 5, broad, blunt lobes, the tube .35 to .5 in. long. *Capsule* unknown.

PERAK, on Gunong Batu Pateh at an elevation of 4,500 feet: *Wray* 231; *Scortechinii* 345B.

4. RHODODENDRON PERAKENSE, n. sp., King & Gamble. Epiphytic; a small shrub with very scaly young branches as thick as a crow-quill. *Leaves* very coriaceous, obovate or broadly oblanceolate, obtuse, much narrowed to the base, the edges recurved, upper surface olivaceous when dry, at first with a few large scales but ultimately glabrous, reticulate, the midrib depressed; lower surface dark brown, with persistent large dark scales in pits, the midrib very thick and prominent; main-nerves 2 (rarely 3) pairs, spreading, very prominent on the under surface, and, like the midrib, with persistent large dark scales, length .6 to .8 in.; breadth .3 to .4 in., petioles about .1 in. long. *Umbels* terminal, 3- to 5-flowered, covered in bud by broad rounded deciduous bracts with ciliate edges; pedicels 25 to .3 in. long, slightly scaly. *Flowers* .35 to .4 in. long. *Calyx* shallow, cupular, its edges wavy. *Corolla* bright yellow, narrowly campanulate, the mouth with broad, slightly spreading lobes. *Stamens* not exserted; filaments glabrous, anthers short. *Ovary* sub-glabrous, style not exserted; stigma clavate, truncate. *Capsule* .3 in. long, dehiscing by 5 straight untwisted valves.

PERAK, at an elevation of 7,000 feet: *Wray* 1574.

5. RHODODENDRON SCORTECHINII, n. sp., King & Gamble. Shrubby, epiphytic or terrestrial, when the latter sometimes sub-arboreous; young branches half as thick as a goose-quill, smooth, terete. *Leaves* very coriaceous, elliptic to elliptic-rotund or obovate, the apex obtuse and sometimes faintly notched, the base cuneate, the edges recurved; upper surface dark olivaceous-brown when dry, glabrous, shining, depressed-reticulate; lower surface of a uniform warm brown, not reticulate, pitted and minutely scaly; main-nerves 4 to 6 pairs, spreading, depressed on the upper surface, and raised on the lower (sometimes very much so); midrib much depressed on the upper surface and prominent on the lower (when dry); length 1.25 to 2 in.; breadth .8 to 1.25 in.; petioles .1 to .15 in. long, scaly. *Umbels* terminal, 4- to 5-flowered; the pedicels unequal, .5 to 1 in. long (longer in fruit). *Flowers* about .75 in. long. *Calyx* short, cupular, with many rounded lobes. *Corolla* yellow (sometimes very pale), .75 in. long, widely flared, the mouth about .6 in. across, with 5 deep, broadly spreading lobes, the outer surface with many dark-

coloured scales *Stamens* about 8, slightly or not at all exerted, filaments glabrous, anthers elliptic, small. *Ovary* scaly, *style* slightly exerted, glabrous, *stigma* clavate hemispheric, lobed *Capsule* 5 in. long, scaly, shortly apiculate, 5-valved, the valves not twisted in dehiscence.

PERAK, at elevations of 5,000 to 7,000 feet *Scortechini* 401B, 753, *Wray* 311, 1572, 3840, *Cantley*

6 RHODODENDRON JASMINIFLORUM, Hook Bot Mag t 4524 Usually epiphytic, a small shrub, only a few feet high, young branches somewhat less than half as thick as a goose-quill, glabrous *Leaves* in whorls, thickly coriaceous, almost sessile, broadly elliptic to elliptic-rotund, the apex acute, the base rounded and minutely cordate, upper surface when dry pale olivaceous-brown, sometimes with a few small loose scales, the 5 to 7 pairs of spreading main-nerves slightly distinct and (like the midrib) depressed, the lower darker brown, not olivaceous, the nerves very faint but the midrib pale and prominent, length 1.25 to 3 in, breadth 1 to 1.5 in, petiole 1 in long *Umbels* terminal, 8- to 20 flowered, the pedicels filiform, .75 to 1 in long, scaly and hairy, bracteoles membranous, broad, glabrous, .25 to .5 in long *Calyx* a shallow toothed cup, less than 1 in deep *Corolla* white, salver-shaped, the tube narrowly cylindric, sparsely scaly or glabrous outside, about 1.5 in in diam and 1.25 to 1.6 in long (when dry), the limb one-third as long, spreading, with 5 deep, broad, obovate-obtuse or rotund lobes *Stamens* 10, the filaments shortly exerted, thin, pubescent, anthers short, broad *Ovary* 5 celled, pubescent, style longer than the corolla tube, pubescent, stigma depressed capitate, grooved *Capsule* about .75 to 1 in long, narrowly sub-cylindric, much apiculate, ridged, its valves recurved to the base and often twisted *Lemaire*, *Jard Fleur* t 41, *Illust Hortie* (1859) t 203, *Clarke* in *Hook f Fl Br Ind III* 463, *Miq Fl Ind Bat II* 1059

MALACCA, on Mount Ophir *Griffith* (K D) 3504, *Maugay* (K D) 701, *Ridley* PERAK *Wray* 1635, *Scortechini*, *King's Collector* 3586, 3645, 6909, *Ridley* 124 —DISTRIB Java, Sumatra

7 RHODODENDRON LONGIFLORUM, Lindl in Journ Hort Soc II<sup>1</sup> 88 with figure Epiphytic, 3 to 6 feet high, young branches half as thick as a goose-quill, densely scaly like the petioles *Leaves* coriaceous, usually elliptic oblong, sometimes elliptic or oblanceolate, subacute, acute, much narrowed to the base, upper surface when dry olivaceous-brown, coarsely and widely reticulate with broad black scales, mostly on the depressed midrib, the 5 to 7 pairs of spreading main-nerves faint, lower surface brown, uniformly covered with black at their scales, ultimately glabrous, the main-nerves indistinct but *Corolla*

stout and prominent; length 2·25 to 3·5 in.; breadth ·8 to 1·5 in.; petioles ·35 to ·5 in. long, stout. *Umbels* terminal, 5- to 7-flowered; flower-pedicels ·5 to ·8 in. long, scaly or glabrous. *Flowers* about 2 in. long, glabrous outside, narrowly sub-campanulate, almost salver-shaped. *Calyx* small, cupular, with wavy edges, under ·05 in. deep. *Corolla* red, infundibuliform; its tube about ·25 in. wide near the base but expanding gradually to about 4 in. or more near the mouth, about three times as long as the broadly bluntly 5-lobed limb. *Stamens* 10, the filaments slender, pubescent, slightly exserted; anthers short, blunt. *Ovary* densely hairy like the style; stigma clavate. *Capsule* unknown. Fl. des Serres, V. p. 477-480f.

PERAK: *Scortechini* 385, 553, 1409; *King's Collector* 1864, 5181.—  
DISTRIB. Borneo, Sumatra.

8. RHODODENDRON MALAYANUM, Jack in Mal. Misc II. n. 7, 17. An erect straggling shrub, 3 to 15 feet high, all parts more or less glandular and scaly; young branches less than half as thick as a goose-quill. *Leaves* narrowly elliptic or lanceolate, the apex and base acute or sub-acute, the edges recurved when dry, upper surface shining, glabrous, and olivaceous when dry, the 5 to 8 pairs of main-nerves faint, slightly depressed, the midrib much depressed and often scaly; the lower of a deep uniform brownish-cinereous colour and with numerous dark scales, the nerves obsolete but the midrib bold and prominent; length 1·75 to 3·25 in.; breadth ·75 to 1·25 in.; petioles ·4 to ·6 in. long, covered with large black scales. *Umbels* terminal, 3- to 5-flowered. *Flowers* ·8 in. long, their pedicels ·25 to ·35 in. long, slender, scaly. *Calyx* cupular, 5-toothed, less than ·05 in. deep. *Corolla* red, glabrous, ·8 in. long (when dry), salver-shaped, the tube about 2 in. in diam. when dry, about ·6 in. long, the limb about 5 in. across when dry, with 5 broad, blunt, cuneate lobes. *Stamens* 10, their filaments glabrous. *Ovary* 5-celled; style slightly exserted from the throat of the corolla, glabrous; stigma clavate. *Capsule* about 1 in. long, slender, ridged, the valves much recurved, twisted. Hook. Journ. Bot. I. 369; DC. Prod. VII. 725; Bot. Mag. t. 6045; Beccari Malesia, I. 205; Clarke in Hook. f. Fl. Br. Ind III. 463. *R. tubiflorum* and *R. celebicum*, DC. l.c. 725; Miq. in Ann. Mus. Lugd. Bat. I. 44, t. 2AB; Fl. Ind. Bat. II. 1059. *R. lampongum*, Miq. Fl. Ind. Bat. Suppl. 585. *Vireya tubiflora* and *V. celebica*, Blume Bijdr. 855, 854.

MALACCA: on Mount Ophir, 4,000 ft., *Griffith* (K D.) 3503; *Mairgay* (K.D.) 702; *Wray*; *Kurz*. PERAK. *Scortechini* 385, 2336; *Wray* 614; *King's Collector* 3227, 8076. PENANG: *Ridley* 125. SELANGOR: *Ridley* 7557.—DISTRIB. Sumatra, Java.

9. RHODODENDRON DUBIUM, n. sp., King & Gamble. A shrub or small

tree; young branches rather thinner than a goose-quill, pale brown when dry, slightly pubescent. *Leaves* coriaceous, glabrous, oblong-elliptic, the apex sub-acute, narrowed from about the middle to the acute or rounded base; both surfaces dull brown when dry and minutely reticulate, the lower pale; main-nerves 15 to 18 pairs, slightly curved, spreading, indistinct on the upper surface, rather distinct on the lower; the midrib very bold and prominent on the lower surface, faint and depressed on the upper; length 3.5 to 6 in.; breadth 1 to 2 in.; petiole .75 to 1 in. long, stout. *Umbels* shortly stalked, 3- to 8-flowered; flower-pedicels unequal, .75 to 1.35 in. long, stout, glabrous. *Flowers* unknown. *Calyx* cupular, .1 in. deep, the mouth wavy. *Ovary* densely rufescent-pubescent. *Capsule* .4 to .7 in. long, rusty-pubescent, very slightly ridged, dehiscing by 5 straight valves, crowned by the persistent pubescent style.

PERAK, at an elevation of 3,400 feet: Wray 233, 460: *Scortechini* 367.

# 5. PERNETTYOPSIS, King & Gamble, nov. gen.

Small rigid epiphytic shrubs. *Leaves* alternate, on short hispid petioles, minutely sub-crenulate, coriaceous, persistent. *Flowers* solitary or in pairs, axillary, with 2 (rarely 3) rather large bracts at their bases forming an involucre, pedicels decurved in fruit. *Calyx* larger than the corolla, rotate, deeply 5-partite, persistent and unchanged in fruit. *Corolla* urceolate or ovoid, glabrous, the mouth constricted and with 5 short reflexed teeth. *Stamens* 10, free, included, the filaments slightly attached by their somewhat dilated bases to the bottom of the corolla-tube. *Anthers* short, inappendiculate at the back or base, oblong, the apices prolonged into 2 long porously dehiscing tubes. *Ovary* faintly 5-lobed, 5-celled, style columnar, stigma simple; ovules numerous, the placentas on the inner angles of the loculi. *Berry* globose, 5-celled. *Seeds* minute, compressed, numerous, angled, testa crustaceous.—DISTRIB. Species 2, both Malayan.

<i>Calyx</i> densely rusty-tomentose ..	..	..	..	1 <i>P. malayana</i> .
<i>Calyx</i> glabrous except the tips of the lobes ..	..	..	..	2. <i>P. sub-glabra</i> .

1. PERNETTYOPSIS MALAYANA, n. sp., King & Gamble. Epiphytic; a bush a foot or two in height; young branches half as thick as a goose-quill, sparsely clothed near their apices with flat adpressed black bristles less than .1 in. long. *Leaves* thickly coriaceous, rotund, obovate to elliptic, the apex broad, minutely apiculate, the base slightly narrowed; upper surface olivaceous-brown when dry, shining, the midrib and main-nerves deeply depressed, the reticulations less so; lower

surface pale dull-brown, with sparse pits, each bearing a short adpressed dark hair, the edges wavy, sub-serrate and adpressed-ciliate; main-nerves 2 or 3 pairs, curving upwards and inwards and interarching, thick but faint on the lower surface; length 1.25 to 2 in.; breadth .75 to 1.35 in.; petioles .1 to .2 in., adpressed-bristly. *Flowers* solitary or in pairs, .4 or .5 in. long, axillary, pedicellate, the pedicels .3 to .4 in. long, twice as long (or more) in fruit, densely rusty-tomentose and recurved when young, erect and less woolly when old. *Involucral bracts* usually 2, thick, about 2 in. long, broad, glabrous inside, rusty-tomentose outside. *Calyx* larger than corolla, rotate, deeply divided into 5 lanceolate, somewhat spreading, lobes; rusty-tomentose outside and sub-glabrous inside. *Corolla* a little shorter than the calyx, glabrous, ovoid-globular, its mouth contracted and with 5 short reflexed teeth. *Stamens* 10, shorter than the corolla, and inserted near its base; *anthers* oblong, broad, cordate and inappendiculate at the base; the apex prolonged into 2 white apically porous tubes; filaments short, bent. *Ovary* sub-globular, laxly and deciduously tomentose, 5-celled; ovules numerous, oblong-concave, attached by the middle to the axillary placentas; style cylindric, slightly grooved, twice as long as the corolla. *Fruit* a berry with scanty pulp, blue when ripe, the seeds red.

PERAK, at elevations of about 6,500 feet, on the summit of Gunong Batu Pateh: *Scortechini* 402, *Wray* 312.

2. *PERNETTYOPSIS SUB-GLABRA*, n. sp., King & Gamble. A small, rigid, epiphytic shrub, young stems slightly thicker than a crow-quill, with a few adpressed bristles near the ends, otherwise glabrous. *Leaves* coriaceous, sub-rotund to elliptic-rotund, minutely apiculate; upper surface dull-brown, minutely reticulate, glabrous, the lower reddish-brown, with a few small adpressed hairs with black bases; main-nerves 3 or 4 pairs, curving upwards, deeply depressed on the upper surface like the midrib, less so on the lower; the edges minutely sub-serrate and sparsely adpressed-ciliate; length .8 to 1.5 in.; breadth .75 to 1.25 in.; petiole .15 to .25 in. long, adpressed-bristly. *Bracts* under the flower 2 or 3, broad, rusty-pubescent externally like the pedicel. *Calyx* longer than the corolla, rotate, with 5 deep lanceolate spreading lobes, glabrous except the rusty-pubescent tips. *Corolla*, stamens, ovary, and style as in *P. malayana*. *Fruit* unknown.

PERAK, at elevations of 5,000 feet. *Scortechini* 752; *King's Collector* 7407.

Order LXVII MONOTROPEÆ

[By D PRAIN]

Leafless, erect, white or coloured root parasites, stems herbaceous, scaly, simple or forked. *Flowers* solitary on the stem or branches, regular, hermaphrodite. *Sepals* usually resembling the scales, 2 to 6, often deciduous. *Petals* 3 to 6. *Stamens* 6 to 12, hypogynous, 2 seriate, filaments filiform or flattened, anthers 2 celled, or by confluence 1-celled. *Ovary* superior, globose or fusiform, 1 to 6 celled, style cylindric, stigma peltate, ovules very many on axial or parietal placentas. *Fruit* capsular, loculicidally 4- to 6 valved, or indehiscent and baccate. *Seeds* very many, minute, testa often loosely sacculate embryo very minute, solid.—*DISTRIB* Genera 9, in dense woods, mostly in temperate regions, all in the northern hemisphere

1 CHEILOTHeca, Hook fil

Small herbs, with erect, simple or forked, white or coloured stems, branches 1 flowered. *Sepals* 3 to 5, narrowly oblong like the uppermost stem scales. *Petals* 3, erect, obtuse. *Stamens* 6, anthers linear, cells 2, confluent at the apex, dehiscing by marginal slits or pores. *Ovary* fusiform, 1 celled, narrowed into the cylindric style, stigma globose conic, usually slightly lobed, placentas 6, parietal, 2 fid, the segments covered throughout by numerous ovules. *Fruit* fleshy, indehiscent, baccate.—*DISTRIB* Species 2, Indo Chinese and Malayan

1 CHEILOTHECA MALAYANA, Scott in Hook fil Icon Plant, XVI t 1564. A root-parasite in dense forest, stem herbaceous, erect simple or 2- to 3 forked, 6 to 9 in high, stoutish. *Scales* ovate oblong, obtuse, imbricated, gradually increasing upwards, lurid purple (*Scortechini*) or waxy white (*Kunstler*). *Flowers* terminal on stem and branches, 1 in long, hidden inside the uppermost scales, and bright yellow (*Kunstler*), or with the tips of the petals exerted and white (*Scortechini*). *Sepals* 5, resembling the uppermost scales, imbricate, linear-oblong, obtuse or sub-acute, glabrous. *Petals* 3, rather larger than the sepals, rounded-cucullate at the apex, externally glabrous, internally more or less pilose. *Stamens* 6, filaments pubescent or pilose, alternately somewhat shorter and longer, anthers short, innate, hippocrepiform, cells confluent at apex, dehiscing by marginal pores. *Ovary* narrowly fusiform, stigma obscurely 4 lobed, placentas 6, parietal. *Fruit* white, fleshy, baccate, 75 in across, tipped by the persistent remains of the stout style. Prain in Journ As Soc Beng LXXIII 2, 205

PERAK, in heavy jungle at about 3,500 feet elevation : *Scortechini* ; *Kunstler* 2715.

According to the field notes recorded by these two careful collectors the specimens gathered by Kunstler differ from those obtained by Scortechini ; in the latter the scales were lurid purple and the flowers were white, in the former the scales were waxy white and the flowers bright yellow. The petals in Kunstler's plant are sparingly minute within and the anthers are nearly twice as long. In other respects, however, the two plants are identical, and the doubt that one feels in connection with the two is not so much as to whether they are conspecific, as it is as to whether this Malayan *Cheiloteca* be really specifically separable from the species from the Khasia Hills upon which Hooker originally based the very distinct genus *Cheiloteca*. The only very tangible differences are that in the Khasia plant only 3 to 4 scales can be with propriety considered sepals, whereas in the Malayan one the number of sepals, as apart from the upper scales or bracts, is 5, and that in the Khasia plant the anthers are long, like linear lips on each side of the connective, whereas in the Malayan plant the anthers are much shorter and distinctly hippocrepiform. The fruit appears to be quite indehiscent, and thus deviates from the fruit in other genera of *Monotropea*, which, so far as is known, is always loculicidally dehiscent.

#### Order LXVIII EPACRIDÆ.

Shrubs or small trees. *Leaves* alternate, rarely sub-opposite or pseudo-verticillate, articulated with the branches, sometimes fascicled or imbricate, coriaceous or rigid, persistent, entire, with parallel longitudinal nerves ; ex-stipulate. *Flowers* hermaphrodite, solitary and axillary or terminal, spicate or racemose, generally white or red, usually bracteate and usually 2-bracteolate, the bracteoles similar to the sepals. *Calyx* 4- to 5-partite, the segments coriaceous, striate, imbricate, persistent. *Corolla* 4- to 5-fid, monopetalous, deciduous or sometimes marcescent ; the tube short or long, often cylindric or funnel-shaped ; the lobes short or long, erect, patent or recurved, imbricate or valvate, persistent. *Stamens* 5, rarely 4, hypogynous or epipetalous, the filaments short or long, filiform or flattened, free ; the anthers dorsifixed, oblong, dehiscent along their whole length by a single slit, 1-celled or spuriously 2-celled. *Disk* cupular, annular or of simple or bifid scales equal in number to the carpels. *Ovary* globose or ovoid, 1- to 10-celled ; style terminal, short or long, filiform ; stigmas punctiform, discoid or lobulate, sometimes annular or indusiate ; ovules in each cell solitary, pendulous, rarely erect ; or many on a central placenta. *Fruit* drupaceous, with 2 to 5 1-seeded pyrenes ; or a many-seeded capsule. *Seeds* small, with fleshy albumen, testa membranaceous ; embryo axile, orthotropous, smooth ; cotyledons short ; radicle elongate, near the hilum.—**DISTRIB.** About 320 species, nearly all Australian, a few in

New Caledonia and New Zealand, the Pacific Islands, or the Malay Archipelago.

LEUCOPOGON, Br.

Shrubs, erect or prostrate, branching, rarely trees. *Leaves* various, sessile or petiolate, striate-nerved. *Flowers* small, white, in axillary or terminal spikes or racemes, the rachis ending in an imperfect flower; bract 1, bracteoles 2 to 3 under the calyx. *Calyx* 5-partite. *Corolla*-tube funnel-shaped or campanulate; lobes 5, valvate in bud, patent or upper part recurved, hairy within. *Stamens* fixed to the top of the corolla-tube, filaments short, filiform, anthers dorsifixed, included or semi-exsert, linear or oblong. *Ovary* 2- to 5-celled; style short or elongated, terminal; stigma sub-capitate; ovules solitary in each cell, pendulous. *Fruit* drupaceous, with a crustaceous or bony endocarp, 1- to 5-celled, cells 1-seeded. *Seeds* small.—*DISTRIB.* About 130 species, all but about 20 Australian, the rest in New Zealand, the Pacific Islands, and the Malay Archipelago.

LEUCOPOGON MALAYANUS, Jack in Mal. Misc. I. v. 20, and Hook. Bot. Misc. II. 71. A small branching shrub, reaching 3 to 6 feet in height, branches grey, marked by the scars of fallen leaves, branchlets very leafy; branch-buds elongate, supported by imbricate parallel-veined ciliate deciduous scales. *Leaves* alternate, sessile, stiff, entire, narrowly lanceolate, acute and mucronate at apex, 1.5 to 2.5 in. long, 3 to 5 in. broad, shining and convex above, dull or glaucous beneath, ciliate when young; midrib none, nerves very close, slender, longitudinally parallel, in old leaves scarcely visible. *Flowers* in short axillary 3- to 7-flowered spikes, .5 in. long, the last flower imperfect; rachis villous, sometimes flexuose; bracts ovate, recurved, bracteoles 2, ovate, acute, ciliate, closely embracing the calyx. *Calyx*-lobes 5, crustaceous, elliptic-oblong, .125 in. long, ciliate. *Corolla* campanulate, .1 to .2 in. long; lobes 5, .1 to .15 in. long, spreading, villous within. *Hypogynous scales* 5, minute, free, obtuse. *Stamens* 5, short, alternate with the corolla-lobes, filaments inserted near the top of the anthers, anthers curved, pendent, opening longitudinally; pollen globose. *Ovary* 5-celled, ovule 1 in each cell, oblong, style erect, .05 in. long, villous; stigma sub-globose. *Fruit* a 5-celled baccate drupe, .1 to .2 in. in diam., each cell 1-seeded. *Seeds* not seen. Wall. Cat 3720, Wall in Roxb Fl. Ind., ed. Carey and Wall. II. 301; G. Don Gen. Syst. III. 777; DC. Prod. VII. 744; Miq. Fl. Ind. Bat. II. 1052; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217, and For. Fl. II. 95; Clarke in Hook. f. Fl. Br. Ind. III. 477. *Styphelia malayica*, Spreng. Syst. IV. Cur. post, 67.

PERAK: Scortechini 760; Cantley 46; King's Collector 7428, 8056.



MALACCA *Jack*; *Griffith* (K.D.) 3453/1, *Maingay* (K.D.) 704; *Lobb*, on Mount Ophir, *Moxon*; *Ridley* SINGAPORE: *Jack*, *Sir R. Schomburgk* 50, *Wallich* 3720; *Ridley* 1832.—DISTRIB. *Bangka*, *Teymann*; *Borneo*, *Ridley*.

VAR. *moluccana*, *Kurz* in *Journ. As. Soc. Beng.* XLVI. ii. 217, and *For. Fl.* II. 96. *Leaves* .5 to 1 in. long, subulate-pointed, venation more prominent, branchlets more slender *L. moluccanum*, *Scheff.* *Obs Phyt.* III 97.

KEDAH peak: *Low*.—DISTRIB. *Tenasserim*, *Helfer* (K.D.) 3453.

### Order LXIX. PLUMBAGINEÆ.

Herbs or undershrubs. *Leaves* various, alternate or fascicled. *Flowers* in terminal scapes or branches, capitate, spicate, racemed or panicled, bracts scarious or leafy, often sheathing the flower, bracteoles 2. *Calyx* inferior, gamiosepalous, tubular or funnel-shaped, 5- to 10-ribbed, often hyaline between the ribs; lobes 5, usually scarious. *Corolla* hypogynous, petals 5, free or connate at the base or united in a linear tube, lobes spreading. *Stamens* 5, opposite the petals, filaments free or adnate in a tube with the corolla, anthers ovate or oblong, dorsifixed, cells parallel, dehiscing longitudinally. *Ovary* superior, sessile or very shortly stalked, 1-celled, 5-angular above, styles 5, distinct from the base or connate below, stigmas sub-capitate, ovule 1, pendulous from a basal ascending funicle, anatropous. *Fruit* included in the calyx or elongate or exsert, dry or indehiscent, membranous or hardened at the apex, circumsciss or breaking near the thin base, the apex often 5-valved. *Seed*, cylindric or elongate, pendulous, albumen copious or little or 0, radicle superior, embryo straight, cotyledons linear or oblong.—DISTRIB. Species about 200, mostly of sea-coasts or desert places throughout the world

Large shrubs with broad-petioled leaves, styles 5, distinct, stamens united in a tube with the corolla

1. ÆGIALITIS.

Perennial herbs with auriculate leaves, style 1, filiform, with 5 stigmatic branches, stamens free .. .. .

2. PLUMBAGO

#### 1 ÆGIALITIS, R Br

Simple-stemmed, soft-wooded shrubs. *Leaves* orbicular, alternate, coriaceous, glabrous, entire, smooth, gland-dotted, reticulately-veined, with long, thick, winged, amplexicaul petioles. *Flowers* in axillary or terminal panicles of racemes; bract 1, sheathing, coriaceous, obtuse; enclosing the 2 bracteoles. *Calyx* tubular, folded, lobes 5, short, induplicate-valvate. *Corolla* usually shorter than calyx, lobes 5,

slightly cohering at base *Stamens* adhering to the base of the petals *Ovary* 1-celled, styles free, stigmas capitate *Fruit* a capsule, linear, long-exserted from the calyx, pentagonal, 1 seeded — **DISTRIB** Species 2, one Indian the other Australian

*ÆGIALITIS ROTUNDFOLIA*, Roxb Fl Ind II 111 A simple-stemmed, soft-wooded shrub, 3 to 8 feet high, stem about 3 in in diam, conical in shape *Leaves* alternate, orbicular, very slightly acute at apex, rounded or slightly cordate at base, diam 2 to 3 in, entire, glabrous, coriaceous, minutely glandular-dotted, shining above, dull beneath, midrib thick and prominent, veins at an angle of 60 degrees with the midrib, closely reticulate, petiole very stout, 2 to 3 in long, prominently winged, the wings sheathing, amplexicaul, leaving annular scars when they fall. *Inflorescence* of axillary or terminal panicle racemes, flowers pale yellow, nearly sessile, enclosed in sheathing bracts, bract 1, 3 to 4 in long, concave, obtuse, enclosing the two similar but smaller bracteoles *Calyx* cylindric, furrowed, 2 to 3 in long, teeth 5, short *Corolla* slightly longer than calyx, lobes 5, narrow *Stamens* inserted on the base of the corolla, filaments shorter than corolla-tube, anthers linear oblong *Ovary* 1 celled, styles free, stigma capitate, ovule 1 pendulous Wall Cat 7240, Griff Notul IV 207, Clarke in Hook f Fl B Ind III 479, Plain Beng Plants I 638 *Æ. annulata* var *rotundifolia*, DC Prod. XII 621 *Æ. annulata*, Kunz in Journ As Soc Beng XLVI n 217, For Fl II 96 (not of R B) *Ægialites rotundifolia*, Presl Bot Bemerk 103

**MALACA** Griffith (K D) 4156 — **DISTRIB** Coasts of Bengal and Burma and the Andaman Islands, in mangrove swamps

## 2 PLUMBAGO, Linn

Perennial herbs or undershrubs, rarely annual, branches usually straggling or sub-scandent *Leaves*, if present, alternate, entire, the petioles usually amplexicaul, auriculate at base *Flowers* in terminal spikes or spicate racemes, forming sometimes a leafy terminal panicle, bract 1, bracteoles 2, usually small *Calyx* tubular, glandular, 5 fid, the teeth erect *Corolla* funnel shaped, tube slender, lobes spreading *Stamens* free, filaments filiform, inserted on hypogynous glands, anthers oblong, dorsifixed, usually exsert *Ovary* attenuate at apex, style slender, divided into stigmatose branches, ovule 1, pendulous from a basal ascending funicle *Fruit* a capsule, included in the persistent calyx and corolla, circumsciss near the base, hardened above, seed splitary, albumen very small, embryo slender, radicle superior, cotyledons oblong — **DISTRIB** About 10 species, found in the warm regions of both hemispheres.

**PLUMBAGO ZEYLANICA**, Linn. Sp. Pl. (1753) 151. A straggling perennial herb; branches rounded, striate, glabrous. *Leaves* alternate, ovate, shortly acute at apex, rounded at base and suddenly narrowed and decurrent, 2 to 5 in. long, 1 to 2 5 in. broad, entire, thin, glabrous above, somewhat scurfy beneath and often glaucous; midrib slender, prominent beneath, main-nerves 6 to 7 pairs, also prominent, curving upwards, secondary nerves and reticulations obscure; petiole 5 to 1 in. long, winged by the gradually narrowing decurrent base of the blade, auricled and amplexicaul at base. *Inflorescence* a terminal leafy panicle of spicate racemes, the rachis densely glandular; bract ovate, acuminate, bracteoles 2, linear-subulate; pedicels very short or none, bracts and pedicels glandular. *Calyx* narrowly tubular, about 5 in. long, more or less deeply 5-fid; lobes slender, hyaline on the margins, covered thickly on the back with prominent stalked red glands. *Corolla*-tube white, slender, funnel-shaped, membranous, about 1 in. long; lobes 5, nearly 5 in. long, ovate, acute, patent. *Stamens* 5, free, filaments very slender, anthers oblong, dorsifixed, exsert. *Ovary* ovoid, style filiform, dividing into 5 stigmatose branches. *Capsule* membranous below, thick above, 5-furrowed, sharply pointed; seed pendulous, oblong; cotyledons obtuse. DC. Prod. XII. 692, Roxb. Hort. Beng. 13, Fl. Ind. I. 462, Wall. Cat. 7241g, Wight Ill. t. 179, Miq. Fl. Ind. Bat. II. 994; Dalz. and Gibs. Bomb. Fl. 220; Kurz in Journ. As. Soc. Beng. XLVI. n. 217, Clarke in Hook. f. Fl. Br. Ind. III. 480; Trimen Fl. Ceyl. III. 65, Prain Beng. Plants I. 639. *P. auriculata*, Bl. Bijdr. 736. *P. viscosa*, Blanco Fl. Filip. ed. I. 78. 'Tumbacodivili,' Rhoebe Hort. Mal. X. t. 8.

PENANG: Curtis 93; Deschamps NEGRI SEMBILAN: Ridley 10095. SINGAPORE: Deschamps, Kuny's Collector 284.—DISTRIB. Tropical regions of the Old World, doubtfully indigenous in the Malay Peninsula or elsewhere.

## Order LXXVIII. GENTIANACEÆ.

[By C. B. CLARKE.]

Herbs, erect, twining, or floating; glabrous except *Microphium*. *Leaves* entire; those of the lower main stem opposite except in the floating plants. *Inflorescence* in 2- to 3-divided cymes, or peduncles 1-flowered. *Flowers* symmetric in calyx, corolla, stamens (except in *Canscora*). *Calyx* tubular or campanulate; lobes 4 to 5 (or by accident (?) 6), oblong or linear. *Corolla* gamopetalous, tube long or short; lobes as many as calyx-segments, usually dextrorsely contorted in the bud. *Stamens* as many as the corolla-segments, all perfect (except in

*Canscora*); filaments on the corolla-tube; anthers of 2 parallel cells. Ovary 1- (or imperfectly 2-) celled; of 2 carpels, superior or stalked or slightly inferior; style linear or oblong; stigma capitate or shortly 2-lobed; placentas parietal, sometimes much intruded, partly coalescing in the axis; ovules very many. Capsule dehiscent or indehiscent, not rarely becoming more or less succulent, seeds many, albuminous.—DISTRIB Species 700; found in all countries.

Erect herbs; lower stem leaves (often all the leaves) opposite —

Glabrous; corolla blue .. ..	1	EXACUM
Pubescent all over .. ..	2	MICRORRHIZUM
Glabrous; corolla rose-coloured or white . . .	3	CANSOCORA

Twine; corolla narrow, more than 1 in. long .. 4. CRAWURIDIA

Floating (or creeping on mud); leaves round-ovate —

Peduncles solitary, from the axil of a long-petioled leaf	5	VILLARISIA.
Peduncles clustered, from the axil of a sessile leaf .	6	LIMNANTHEUM.

# 1 EXACUM, Linn.

Glabrous erect herbs. Leaves opposite, usually 3- to 5 nerved. Flowers panicle, 4- to 5-merous. Calyx deeply lobed. Corolla rotate, tube globose, lobes ovate or oblong, blue or white. Stamens attached in the corolla throat; anthers large, of two oblong cells, which open first by terminal pores or short slits. Ovary more or less completely 2-celled; style linear; stigma sub-capitate. Capsule globose, septically 2-valved, seeds numerous, minute, cuboid.—DISTRIB. Species 30, whereof 20 Indian, the others in China, Malaya, Africa.

Stem 1 to 4 feet; corolla-lobes $\frac{1}{2}$ in long, azure blue ..	1	<i>E. tetragonum</i>
Stem 4 to 12 in., corolla-lobes $\frac{1}{4}$ to $\frac{1}{2}$ in. long, pale blue ..	2	<i>E. pedunculatum</i> .

1. EXACUM TETRAGONUM, var.  $\beta$  *stylosa*, C. B. Clarke in Hook fil. Fl. Br. Ind. IV. 95 Stem 1 to 4 feet, quadrangular. Leaves 5 by 1 in, sessile, lanceolate, 3- to 5-nerved. Panicle many-flowered, bracts at its divisions .25 to .5 in. long, linear, flowers 4-merous, or rarely 5-merous. Calyx-lobes .25 in. long, ovate acuminate. Corolla-lobes .5 in. long, broadly elliptic acute, full azure-blue. Anthers .2 in. long, straight. Style .5 in. long. Capsule globose, .25 in. in diam. *E. stylosum* (sp.), Griseb. in DC. Prod. IX. 46. *E. chronioides*, Griseb. Gent. 109, in DC. Prod. IX. 45. *E. Horsfieldianum*, Miq. Fl. Ind. Bat. II. 556. *E. sulcatum*, C. B. Clarke in Journ. Linn. Soc. XIV. 425 (not of Roxb.). *E. tetragonum*, Vidal Fl. Filip. 191.

SINGAPORE. Lobb 473.—DISTRIB. From Burma to Borneo and the Philippines.

2. EXACUM PEDUNCULATUM, Linn. Sp. Pl. ed. I. 112; ed. II. 163.

*Stem* 4 to 12 in., quadrangular, often much-branched. *Leaves* 1·5 by ·5 in., sub-sessile, elliptic or lanceolate, 3 nerved. *Panicle* usually compound, many-flowered; lower bracts similar to the leaves, by degrees smaller, to the upper less than ·25 in. long; flowers 4-merous. *Calyx-lobes* 17 to ·2 in. long, ovate, acute, winged. *Corolla-lobes* ·25 to ·35 in. long, pale blue. *Anthers* ·12 in. long, dehiscing finally half-way down. *Capsule* globose, ·17 in in diam DC Prod. IX. 46; Hook. fil. Fl. Br. Ind. IV. 97; Trimen, Fl. Ceyl. III 182 *E. pedunculare*, Arn in Ann. Sc. Nat. ser. 2, XI. 176, Wight Ic t. 336. *E. sulcatum*, Roxb. Fl. Ind ed. Carey & Wall I 415, DC. Prod IX. 46 (*syn. excl.*).

SINGAPORE · *Lobb* 358.—DISTRIB. From Oudh and Bengal to Ceylon and Pegu.

## 2. MICRORPHIUM, C B Clarke, gen. nov.

A pubescent erect herb, repeatedly branched. *Leaves* alternate except a few distant opposite pairs on the main stem. *Flowers* numerous, solitary, pedicelled, in unilateral repeatedly branched cymes. *Calyx* short-cylindric, terete, sub-2-lipped, almost leathery, lobes 5, short. *Corolla* small; tube campanulate, lobes 5, equal, dextrorsely contorted in the bud. *Stamens* 5, equal, perfect; anthers exsert, cells oblong, parallel, dehiscing by a slit their whole length. *Ovary* 1-celled; placentas intruded, style linear, stigma sub-capitate. *Seeds* very small, ovoid, not angular.—DISTRIB. Species 1, Malayan.

1. MICRORPHIUM PUBESCENS, C. B. Clarke, sp. nov. *Stem*, leaves, inflorescence, calyx covered with a short thick grey pubescence. *Stem* (upper part seen) 14 in. long, the lower part with opposite pairs of leaves (and branches) 2·5 in apart, all the other numerous stem-divisions and leaves alternate. *Leaves* of the main stem ·75 by ·35 in., elliptic, entire, obtuse, narrowed at base; petiole 0 to ·1 in. long; the other leaves similar but smaller. *Pedicels* ·25 in. long. *Calyx* ·2 in. long, opening at first in two lips, one emarginate 2-nerved, the other ovate 3-nerved. *Corolla-tube* broad, lobes short, round, soon reflexed over the calyx-margin. *Capsule* ovoid, 2 in. long, dry; seeds 200  $\mu$  in diam. *Pollen* globose, 25  $\mu$  in diam.

KEDAH *Curtis* 2528. "Height 1 to 2 feet; petals white; anthers yellow" (*Curtis*).

## 3. CANSORA, Lam.

Herbs, dichotomously branched, glabrous or very nearly so. *Leaves* opposite. *Flowers* mostly cymose. *Calyx* large, membranous, tubular, often winged; teeth much shorter than the tube. *Corolla-tube* cylindric, lobes 4, unequal (except in *C. pentanthera*). *Ovary* 1-celled;

placentas intruded; style linear, lobes 2, hemispheric. *Capsule* 2-valved or breaking up irregularly. *Seeds* very small, polyhedral.—DISTRIB. Species about 25, extending from Africa through South-east Asia to Australia.

One stamen only perfect; corolla irregular	..	..	1. <i>C. diffusa</i> .
All stamens perfect; corolla regular	..	..	2. <i>C. pentanthera</i> .

Sub-genus 1. EU-CANSCORA. Calyx 4-toothed. Corolla sub-bilabiate. Stamens 4; 1 larger perfect, 3 shorter smaller or obsolete.

1. CANSCORA DIFFUSA, R. Brown, Prodr. (1810) 451 in Obs. Erect annual, 4 to 20 in., much branched upwards. *Leaves* 1·5 by 5 in., lanceolate or elliptic, 3-nerved, often petioled, upper smaller. *Cyme* diffuse; lower bracts at its divisions ·5 in. long, ovate, upper much smaller. *Calyx*  $\frac{1}{2}$  in long; teeth lanceolate-linear. *Corolla* rose-coloured; tube  $\frac{1}{2}$  in., lobes  $\frac{1}{2}$  in. *Capsule* oblong, as long as the calyx. DC. Prod. IX. 64, Benth. Fl. Austral. IV. 372; Hook. fil. Fl. Br. Ind. IV. 103; Trimen Fl. Ceyl., III. 184. *Exacum diffusum*, Willd. Sp. Pl. I. 637. *Orthostemon erectum*, R. Br. Prod. 451; DC. l.c. 63. *O. Hugelinii*, DC. l.c. 63. *Pladera virgata*, Roxb. Fl. Ind. ed. Carey & Wall. I. 417; Hook. Bot. Misc. III. 88 t. 25.

SINGAPORE: Lobb 345. A common species, extending from East Tropical Africa throughout India to Australia and the Philippines.

Sub-genus 2. PENTANTHERA. Stamens 5 (or 6), equal, anthers all similar, perfect. Corolla-lobes 5 (or sometimes 6), equal, dextrorsely contorted in the bud.

2. CANSCORA PENTANTHERA, C. B. Clarke, sp. nov. A slender under-shrub, 18 in. high, glabrous except the minutely gland-puberulous (young) petioles; stem terete with many opposite branches. *Leaves* opposite, 3 by 1 in., ovate-lanceolate, acuminate, attenuate at the base; petiole 0 to ·2 in. *Cymes* loosely, repeatedly dichotomous, often carrying 10 flowers, bracts at the divisions similar to the leaves, but gradually smaller, becoming sessile, a few pairs connate into perfoliate bracts. *Flowers* solitary, ·5 in. long, on pedicels ·12 to ·5 in. long. *Calyx* 35 in. long, membranous; tube triquetrous, narrowly 3-winged, ovoid-cylindric, lobes less than one-third the length of the tube, ovate, imbricate, apiculate. *Corolla* white (*Ridley*); tube as long as the calyx, lobes 5 (or not rarely 6), oblong-elliptic, equal, sub-erect, contorted dextrorsely (*sensu Lanneano*) in the bud. *Stamens* 5 (or 6 in the 6-lobed corolla), equal, perfect; filaments inserted in the upper part of the corolla-tube from which the erect anthers are half-exsert; anther-cells 2, oblong or linear-oblong, opening by longitudinal slits, pollen 25 by 20  $\mu$ , ellipsoid, irregularly longitudinally striate. *Ovary* oblong, when young thin,

almost succulent; placentas much intruded; style linear, with 2 round stigmatic lobes. *Capsule* broad-ellipsoid, crustaceous, almost succulent (dehiscence not clear); style persistent; seeds 300  $\mu$  in diam., ovoid, somewhat angular, brown.

PERAK, Waterloo: *Robertson* 9088. SELANGOR: Sua Batu, *Ridley*; Gua Batu, *Ridley* 8218. KEDAH: Langkau, *Curtis* 2516.

THIS species, the only one in the sub-genus, differs in the aestivation of the corolla, the number of the stamens, the anthers all equal, the persistent style, from the characters assigned to *Canscora*.

#### 4. CRAWFURDIA, Wall.

Glabrous twiners. *Leaves* opposite, petioled, 3-nerved. *Flowers* showy, axillary. *Calyx* tubular; teeth 5 (or 4), long, often very long. *Corolla* long, tubular-funnel-shaped; lobes 5, short. *Stamens* 5 on the corolla-tube; anthers oblong. *Ovary* stalked, 1-celled, placentas parietal; style linear, stigmas 2, short-oblong. *Fruit* globose or ellipsoid, berried or capsular; seeds many, 2- (or imperfectly 3-) angled.—**DISTRIB.** Species 10–12, extending from India to Manchuria

1. CRAWFURDIA BLUMII, G. Don Syst. IV. 200. *Stem* often 3 to 4 feet long. *Leaves* (blade) 1.5 by .75 in., ovate-lanceolate, acute, entire; base rounded or narrowed; petiole .35 in. *Flowers* axillary, solitary, sub-sessile, or the pedicel .25 to 1.5 in. long. *Calyx* narrow, angular; tube .2 in. long, teeth .25 in. long, linear. *Corolla* 1.25 to 1.5 in. long, light purple. *Fruit* .6 in. long, ellipsoid, purple, succulent. *Seeds* imperfectly 3-angular, angles (or 2 of them) often narrowly winged. Miq. Fl. Ind. Bat. v. II. 561 (*Blumer*). *C. trinervis*, Hassk. Cat. Hort. Bogor 128, in Tidjch. Nat. Gesch. X. 126. *Tripterospermum trinerve*, Blume Bijdr. 849, Griseb. in DC. Prod. IX. p. 121. [Cf. C. B. Clarke in Fl. Br. Ind. IX. p. 107, sub *Crawfurdia* affini, Wallich.]

PAHANG, 7,000 feet alt. . Wray 1570.—**DISTRIB.** Sumatra, Java.

#### 5 VILLARSIA, Vahl

Floating, glabrous herbs. *Leaves* long-petioled, ovate, entire or sinuate. *Peduncles* solitary, 1- (or many-) flowered. *Calyx* deeply 5-lobed. *Corolla* broadly campanulate; tube short, lobes sub-rotate. *Stamens* 5; filaments filiform, on the corolla-tube; anthers sagittate. *Ovary* 1-celled; style short; stigma of 2 small lobes; placentas parietal. *Capsule* globose, 1-celled, 4-valved at the apex; seeds several (or numerous).—**DISTRIB.** Species 12, in Africa or in Australia, except the following Malay species.

1. VILLARSIA AURANTIACA, Ridley MS. A small herb; stems 2 in.

long, with leaves and peduncles at the nodes. *Leaves* all long-petioled, .35 in. in diam., widely excavated at the base, ovate, margin sinuate; petiole .5 to 2 in. long. *Peduncles* solitary, 1 to 2 in. long, ebracteate, 1-flowered. *Calyx* .17 in. long, lobes oblong. *Corolla* .35 in. in diam.

PAHANG: Kwala Pahar, Ridley.

This example shows no fruit, and the flowers are not in a state for dissection. This collection has been supposed to be near *Limnanthemum parvifolium*, Griseb., which has smaller flowers, with the peduncles (several) clustered in the axil of a sessile leaf. This plant of Ridley appears to come near the Swan River *Villarsia violifolia*, F. Muell.

## 6 LIMNANTHEMUM, S. P. Gmel.

*Peduncles* several in the axil of a nearly sessile leaf. *Capsule* thin, breaking up irregularly, otherwise as *Villarsia*.—DISTRIB. Species 20, dispersed throughout the Tropical and Temperate Zones

1. LIMNANTHEMUM PARVIFOLIUM, Griseb. in DC. Prod. IX. 141. *Stem* 3 to 8 in. long, slender, with distant nodes. *Leaf* 75 in., round, ovate, excavated at base, gland-dotted on the under surface; petiole scarcely .08 in. *Peduncles* clustered, 0 to 25 in. long. *Calyx-lobes* .08 in. long, lanceolate, acute. *Corolla-lobes* .17 in. long, white, fimbriate. *Capsule* .17 in. long, ellipsoid, sessile, about 10-seeded, seeds smooth but with capitate papillæ sparsely irregularly scattered. Hook. fil. Fl. Brit. Ind. IV. 132, Trimen, Fl. Ceyl. III. 189

SINGAPORE. *Cuming* 2280 (in Mus. Brit.)—DISTRIB. Malabar, Ceylon, Chittagong to Tavoy.



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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., F.L.S., *late Superintendent of the Royal Botanic Garden, Calcutta*, and J. SYKES GAMBLE, Esq., C.I.E., M.A., F.R.S., F.L.S., *late of the Indian Forest Department.*

No. 17.

This contribution embraces the Natural Orders *Myrsinaceæ*, *Sapotaceæ*, *Ebenaceæ*, *Styraceæ*, *Oleaceæ*, which are given under the joint names of the authors, the actual descriptions having been prepared by Sir George King for the *Ebenaceæ* and by Mr. J. S. Gamble for the rest.

The 5 Natural Orders comprise 24 genera and 221 species. There are no new genera, but the number of new species reaches 103.

### Order LXX. MYRSINACEÆ.

Trees, shrubs (erect or climbing), or undershrubs, generally evergreen. *Leaves* usually alternate, sometimes opposite, entire dentate or crenate, often dotted with pellucid round or linear resinous glands. *Stipules* none. *Flowers* regular, usually small, white or reddish; hermaphrodite or occasionally polygamo-diœcious; generally in panicles, racemes or umbels. *Calyx* inferior (in *Mæsa* adnate to the ovary), 4-6-lobed, the lobes valvate or imbricate, sometimes enlarged in fruit, persistent, often marked with glandular dots or lines. *Corolla* 4-5-lobed; the tube usually very short, sometimes wanting, lobes twisted to the left in the bud, usually overlapping to the right, rarely

valvate, often gland-dotted or -striate. *Stamens* opposite to the corolla-lobes and equal to them in number, free or adnate to the lobes or in an inner ring, generally erect; filaments long or short; anthers opening by slits, usually introrsely, sometimes septate as in *Ægiceras* and *Ardisia littoralis*, sometimes with terminal openings as well, free or adherent by their edges; the connective often thickened and produced, sometimes glandular; staminodes sometimes present, though not in Malay species. *Ovary* globose, ovoid or oblong, free (in *Mæsa* adherent to the calyx-tube), 1-celled, narrowed into or surmounted by the style; style filiform or columnar, stigma usually simple; ovules few or many, inserted on or immersed in a free usually globose central placenta. *Fruit* usually small, globose (in *Ægiceras* linear, curved, acuminate); epicarp fleshy, mesocarp crustaceous, endocarp membranous, separable; usually one- rarely several-seeded (as in *Mæsa*), indehiscent. *Seeds* usually globose, hollowed at the base: in *Mæsa* many and angled; albumen pitted or ruminate; embryo transverse, cylindric; radicle usually elongate — **DISTRIB.** Tropical or sub-tropical regions of both hemispheres, chiefly in Asia and South America; genera 32, species upwards of 900 (according to Mez Monog. *Myrsineæ*).

Calyx-tube adnate to the ovary; fruit many-seeded (Tribe I. **MÆSÆ**)

Trees or shrubs; calyx 2-bracteolate; flowers in simple or compound racemes . . . . . 1. **MÆSA**.

Calyx tube free from the ovary, fruit one-seeded (Tribe II. **EUMYRSINÆ**) —

Fruit round, anther-cells usually opening by slits, rarely septate —

Corolla-lobes imbricate in bud —

Flowers in axillary or lateral fascicles; trees or shrubs . . . 2. **MYRSINÆ**

Flowers in racemes or panicles; climbing plants, rarely shrubs . . . . . 3. **EMBELIA**.

Corolla-lobes valvate in bud, flowers in paniculate spike like racemes, small shrubs with parallel-veined leaves . . . 4. **LARISIA**.

Corolla lobes contorted in bud. —

Anthers sagittate, rarely septate, corolla lobes overlapping to the right . . . . . 5. **ARDISIA**

Anthers sagittate lanceolate, the connective produced in a membranous wing, corolla-lobes overlapping to the left . . . 6. **ANTISTROPHÆ**

Fruit elongate, cylindric, long-pointed; anthers markedly septate 7. **ÆGICERAS**.

### 1. **MÆSA**, Forsk.

Trees or shrubs, erect or straggling. *Leaves* entire, dentate or serrate, usually pellucid-punctate, sometimes with resinous lines. *Flowers* hermaphrodite or unisexual, in terminal or axillary racemes, the pedicels bracteate. *Calyx* bibracteolate, 4-5-lobed; lobes persistent,

imbricate, the tube adnate to the ovary, sometimes with resinous lines *Corolla* shortly campanulate, 4-5-lobed, the lobes usually as long as the tube or rather shorter, rounded with inflexed tips, sometimes resinous-lineate *Stamens* 4 or 5 inserted on the corolla tube, filaments short, anthers introrse, oblong-cordate *Ovary* adnate to the calyx-tube, style short, stigma small, entire or shortly 3-5-lobed, ovules numerous, placenta globose *Fruit* small, dry or fleshy, ovoid or subturbinate, crowned with the persistent style, many seeded *Seeds* numerous, angular, immersed in hollows of the placenta, and arranged around it with hexagonal surfaces, embryo small, oblique or transverse, cotyledons narrowly ovate—*DISTRIB* Species over 100 (according to Mez), chiefly in the tropical regions of the Old World, a few in Australia and the Pacific Islands, all the Malayan species belonging to sub-genus *Eumæsa*, Mez

Leaves entire —

Flowers in large terminal leafy panicles, branches of the inflorescence pubescent

1 *M macrothyrsa*

Flowers in large axillary or pseudo terminal panicles of racemes, branches of inflorescence glabrous

2 *M lamentacea*

Leaves faintly lobed —

Leaves very slightly dentate almost coriaceous under 3 5 in long, midrib and main nerves very prominent, inflorescence as long as or only a little shorter than leaves

3 *M impressinervis*.

Leaves membranous, over 4 in long —

Leaves pale when dry under 3 in broad, distantly dentate, inflorescence longer than the petiole

4 *M striata*

Leaves dull green when dry, over 4 in broad, inflorescence scarcely longer than the petiole

5 *M pahangiana*

Leaves prominently dentate

6 *M indica*

1 *MÆSA MACROTHYRSA*, Miq Fl Ind Bat. Suppl 573 (1862) A slender climbing shrub reaching 30 to 50 feet in length, branches brown, somewhat angled and flexuose, striate *Leaves* entire, chartaceous, elliptic, shortly bluntly acuminate at apex, rounded at base, smooth and dull on both surfaces, 3 to 4 in long, 1 5 to 2 in broad, midrib prominent, impressed above, main-nerves 5 to 7 pairs, distant, starting from the midrib at about 60° and curving upwards, secondary nerves and reticulations indistinct, petiole 5 to 7 in long, channelled above by the decurrent margins of the blade *Inflorescence* a large leafy terminal many-flowered tripinnate panicle, the branches rusty pubescent, pedicels about 0.25 in long, supported by a slightly shorter ovate acute bract, and bearing 2 similar bracteoles below the flowers *Calyx* superior, cupular, lobes 4, occasionally 5, rounded, denticulate, 0.4 in long, gland-dotted, tube very short *Corolla* dull white or pink, longer than calyx, tube as long as lobes, lobes 4 or 5, rounded, often with

small lobules between, denticulate, with about 3 to 4 glandular lineoles. *Stamens* inserted near the base of the corolla-tube; anthers globose; filaments about twice as long as anthers. *Ovary* rounded, depressed, crowned with a short cylindric style and obtusely 3-4-lobed stigma. *Fruit* very small, .05 in. in diam., globose, glabrous, faintly striate, crowned about one-third of the way down with the persistent calyx-teeth. *Seeds* very minute, angled. Scheff. Myrs. 29; Mez Monog Myrs. 49. *M. floribunda*, Scheff. Myrs. 18. *M. Korthalsiana*, Scheff. Myrs. 18 (?)

PERAK: Wray 2684; Scortechini 122, 1655; King's Collector 725, 2722, 3777, 4968, 5326.—DISTRIB. Sumatra, Korthals, Beccari 887; Borneo, de Vriese, Teysmann.

We have always found the flowers tetramerous, as described by Miquel and Scheffer. Mez describes them as either 4- or 5-merous. This is a well-marked species on account of its large terminal inflorescence, whose pubescent branches easily distinguish it from those occasional forms of *M. ramentacea* which have part of the inflorescence pseudo-terminal.

2. *MÆSA RAMENTACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 231 (1824). A large shrub or small tree, usually branched from the base and sending out many straggling or climbing branches often 30 to 40 feet long or more, branchlets smooth, somewhat striate when dry. *Leaves* entire, chartaceous, ovate-lanceolate or elliptic, acuminate at apex, rounded or cordate at base; 3 to 8 in. long, 1 5 to 4 in. broad; smooth on both surfaces and generally shining above, midrib prominent, often impressed above, main-nerves slender, distant, 5 to 10 pairs, starting at 45° with the midrib and curved upwards, secondary nerves and reticulations not apparent: petiole .3 to .5 in. long, slightly winged by the decurrent margins of the blade, which are often connivent above. *Inflorescence* axillary or sometimes pseudo-terminal, glabrous, many-flowered, consisting of more or less closely packed racemes arranged in bipinnate panicles, shorter or longer than the leaves; pedicels 1 to .15 in. long, slender, supported by a minute lanceolate bract and with 2 very minute ovate-lanceolate bracteoles below the flower; buds minute, globose, depressed at top. *Calyx* superior, cupular; tube very short, about .025 in. long; lobes 5, ovate, faintly ciliate, as long as the tube. *Corolla* .075 in. long, lobes half the length, ovate or ovate-reniform, edges undulate, with a few brown glandular lineoles. *Stamens* short, longer in ♀ flowers, inserted a little below the top of the tube; anthers rounded, filaments as long as the anthers, dorsifixed. *Ovary* in ♀ flowers adnate to the base of the calyx-tube, style short, stigma minutely 4-lobed, ovules many. *Fruit* globose, .1 to .15 in. long, crowned with the persistent teeth of the calyx; seeds minute, angled,

albuminous, embryo small, transverse. A. DC. in Trans. Linn. Soc. XVII. 139, Prod. VIII. 77; Scheff. Myrs. 15; Miq. Fl. Ind. Bat. II. 1006; Kurz in Journ. As. Soc. Beng. XLVI. ii. 220; For. Fl. II. 99; Clarke in Hook. f. Fl. Br. Ind. III. 508; Koord. & Val. Bijdr. V. 218; Mez Monog. Myrs. 27; Prain Beng. Pl. 642. *M. ovata*, A. DC. l.c. 133, t. 4, Prod. l.c. 77; Scheff. Myrs. 14. *M. lanceolata*, Don Prod. 148. *M. acuminata*, *missionis*, and *glabra*, DC. Prod. l.c. 77, 78, 82. *M. sumatrana*, Scheff. Myrs. 15. *Bæobotrys ramentacea*, Roxb. Hort. Beng. 16, Fl. Ind. I. 558; Wall. Cat. 2322. *B. ovata*, Wall. Cat. 2324. *B. glabra*, Roxb. Fl. Ind. I. 560. *B. fragrans*, Wall. Cat. 2323. *B. (?) missionis*, Wall. Cat. 6523.

\* KEDAH: Langkawi, Curtis 2554, 3409. PENANG: Wallich 2324, Mangay (K D.) 1001; J. Scott, G. King; Phillips; Deschamps. PERAK: Scortechini 382A, 606B, 628; Wray 1286, 1291, 1912, 2363, 2787; King's Collector 171, 1222, 1909, 2788, 3883, 4144, 4281, 4497, 4915, 5088, 5113; Curtis. PAHANG: Ridley 2175. SELANGOR: Ridley, Goodenough 10554. NEGRI SEMBILAN: Ridley 10067. MALACCA Griffith (K D.) 3552; Cuming 2286; Miller 9; Herve; Goodenough 1036, 1742; Derry 37, 1063; Ridley 10099. JOHORE: Lake & Kelsall 4035; G. King. SINGAPORE: Schomburgk 91; Lobb 324; T. Anderson 126, Ridley 2064, 2805; Goodenough 1644; Hullett 38, 56, 885, 887.—DISTRIB. Eastern Bengal and Burma, Andaman and Nicobar Islands, Sumatra, Java, Borneo.

We follow Mez in not keeping up the var. *ovata*. The large mass of material available shows clearly that in shape of leaf and in inflorescence the variation is regular, and that the form with cordate long-acuminate leaves passes gradually into that with ovate broad short-acuminate leaves, and that similarly the inflorescence changes. A monstrous form with moss-like inflorescence similar to those often seen in India on *M. Chusa* and other species, is not uncommon.

3. *MÆSA IMPRESSINERVIS*, King & Gamble, n. sp. A bush or small tree, branches half as thick as a goosequill, glabrous, pale brown, and prominently longitudinally wrinkled when dry. Leaves thinly coriaceous, elliptic, shortly acuminate at apex, cuneate at base, entire or very faintly dentate only near the apex, margins recurved when dry, reticulate and shining above, dull and paler beneath; 3 to 3·5 in. long, 1·25 to 1·75 in. broad; midrib prominent, impressed above, main-nerves 7 or 8 pairs, also prominently impressed above and prominently raised on the lower surface, arching upwards to meet near the margin; secondary nerves few, inconspicuous as are the reticulations, petiole 2 to 2·5 in. long, bordered by the decurrent edges of the blade, which are almost connivent above. Inflorescence an axillary raceme, simple or with one short branch near the base, 1·5 to 2·5 in. long, and so shorter

than the leaves; pedicels slender, .1 in. long, with a .06 in. long subulate bract at the base and 2 similar bracteoles beneath the flower; buds nearly globose. *Calyx* superior, .05 in. in depth, cupular, with 5 imbricate broad incurved concave glabrous lobes. *Corolla* rotate with 5 imbricate rounded broad lobes, .1 in. deep; tube rather longer than lobes. *Stamens* 5, inserted on the base of the corolla, anthers globular; filaments flattened, longer than the anthers. *Ovary* inferior, depressed, surmounted by a flattened lobed stigma, 1-celled; ovules many, cuneate, on a central basal placenta. *Fruit* unknown.

PERAK: Gunong Bubu, at 5,000 feet elevation; Wray 3850, 3886.

4. *MÆSA STRIATA*, Mez Monog. Myrs. 42 (1901). A shrub or small tree; branches smooth, reddish, with scattered lenticels. *Leaves* membranous; rather variable, elliptic or elliptic-oblong, rounded or acuminate at apex, bluntly acute and sometimes unequal at base, entire or undulate or broadly dentate, especially on the upper half, pale green when dry, glabrous except for a few occasional stiff hairs on the midrib beneath, striate with many faint very slender lineoles, 4 to 7 in. long, 2.5 to 3 in. broad, midrib angular, prominent beneath, main-nerves 7 to 8 pairs, slender, secondary nerves and reticulations faint and irregular; petiole slender, 4 to 1 in. long, channelled above. *Inflorescence* of axillary racemes, simple or joined in a sub-sessile panicle, rarely over 2 in. long, pedicels very slender, .05 to .1 in. long, with a subulate bract at base, half their length, and 2 acute bracteoles under the flower. *Calyx* superior, about .1 in. deep, lobes 5, imbricate, ovate, rounded, about 4-striate, edges hyaline; tube as long as lobes. *Corolla* as long as calyx, rotate, .1 in. in depth; lobes 5, imbricate, rounded, crenate, glabrous. *Stamens* 5, inserted near the base of the corolla; anthers ovate, slightly divaricate; filaments 2 to 3 times as long as anthers. *Ovary* inferior, depressed, rounded; style short cylindrical, stigma 4-lobed; ovules many, cuneate, on a central basal placenta. *Fruit* round, .1 to .15 in. in diam., smooth, faintly ribbed, crowned by the persistent calyx-lobes and style.

PENANG at Paya Trobong, Curtis 2857. PERAK: King's Collector 2287.—DISTRIB. Sumatra, Forbes 1260, 1287, 1315, 1376.

5. *MÆSA PAHANGIANA*, King & Gamble, n. sp. Apparently a shrub; branches round, smooth, dark brown when dry. *Leaves* membranous, rhomboid-obovate, acuminate at the apex, rounded cuneate at base, faintly crenate especially in the upper half; glabrous on both dull surfaces; 7 to 8 in. long, 4 to 4.5 in. broad; midrib slender, prominent beneath; main-nerves distant, 8 to 9 pairs, at about half a right angle with the midrib, sometimes branched; secondary nerves few and like the reticulations indistinct; petiole slender, .8 to 1 in. long. *Inflores-*

cence a simple axillary raceme, as long as or slightly longer than the petiole, pedicels slender, about 1 in long, supported by a minute subulate bract below and with two similar bracteoles below the flower *Calyx* superior, cupular, with a very short tube and 5 triangular imbricate teeth 6 in long, glabrous, hyaline at the edges and very faintly brown glandular *Corolla* as long as calyx, lobes 5 imbricate, glabrous, rounded, somewhat crenate, with 2 to 3 prominent brown glandular lineoles, tube half the length *Stamens* nearly as long as corolla, inserted near its base, filaments about twice as long as the anthers, anthers emarginate, cells somewhat divaricate *Fruit* globose with a conical tip surrounded by the remains of the corolla and the persistent calyx, and surmounted by the short persistent style, ribbed, 125 in in diam, glabrous

PAHANG at Tanjong Antan, Ridley 2175A

Only one specimen is unfortunately available, and that in fruit with only remains of flowers

6 *MUSA INDICA*, Wall in Roxb Fl Ind ed Carey & Wall II 230 (1824) A shrub reaching 4 to 6 feet in height, branchlets brown, smooth, lenticellate *Leaves* chartaceous, elliptic or elliptic oblong, acuminate, rounded or acute at the base, repand dentate, about 3 teeth to each main nerve, 3 to 7 in long, 2 to 3 in broad, midrib very prominent, often broad, main nerves 8 to 12 pairs, others closely reticulate, glandular striæ long, prominent, petiole 5 to 1 in long, channelled above by the decurrent bases of the blade *Inflorescence* of simple or compound axillary racemes, much shorter than the leaves, usually 1 to 3 in long, pedicels slender, .05 to 1 in long, longer in fruit, bracts subulate, in flower as long as pedicels, bracteoles 2, minute *Calyx* superior, with 5 imbricate lobes, which are ovate, ciliate, striate, about .04 in long, almost acute or rounded at apex *Corolla* as long as calyx, lobes denticulate, glandular striate, tube as long as lobes *Stamens* inserted at base of corolla-tube; anthers ovate, cells divaricate, filaments dorsifixed, rather longer than anthers *Ovary* rounded, style short cylindric, stigma obtuse, ovules many *Fruit* round, smooth, striate, 15 in long, crowned at the summit by the persistent calyx lobes and the remains of the stigma *Seeds* angular A DC. in Trans Linn Soc XVII 134, Prod VIII 80 (*in part*), Wall Cat 2318 E, Clarke in Hook f Fl Br Ind III 509 (*in part*), Koord & Val Bijl V 222, Mez Monog Myrs 29 *Baobotrys indica*, Roxb Hort Beng 16, Fl Ind I 557

PERAK Wray 3314, 3349, *Scortechini*\* 16, 733, Ridley 3007, 9741, King's Collector 7712 —DISTRIB Burma, Java



## 2. MYRSINE, Linn.

Trees or shrubs. *Leaves* entire or serrate, often thick, usually pellucid-punctate. *Flowers* polygamous or diceious, fascicled, axillary or on very short branches, pedicels short with many imbricate bracts. *Calyx* small, lobes 4 to 5 persistent. *Corolla* 4-5-lobed, the lobes imbricate in bud, recurved in flower. *Stamens* 4 to 5; filaments short, inserted at the base of the corolla-lobes; anthers short, ovate; staminodes none. *Ovary* free, globose or ovoid; style usually short, cylindric or angular; stigma capitate or 2-5-lobed; ovules few or many, immersed in the placenta. *Fruit* a small, dry or somewhat fleshy, berry, 1-seeded. *Seed* solitary, globose, sessile, hollowed at the base; albumen pitted, embryo elongate, cylindric or curved, horizontal.—*DISTRIB.* Species about 80, chiefly tropical, a few in Japan, extra-tropical Africa, Australia and New Zealand. All our species belong to Mez' genus *Rapanea*.

Arrested branches bearing the umbels very short, .1 in. long or under.—

Leaf-nerves and reticulations obscure, leaves small, under 2.5 in. 1. *M. aeneis*.

Leaf-nerves and reticulations visible, leaves usually over 2.5 in. :—

Leaves under 4 in. long, chartaceous, blackish when dry; pedicels short, .1 in. long .. .. . 2. *M. Porteriana*.

Leaves over 4 in. long, coriaceous, reddish when dry, pedicels over 15 in long .. .. . 3. *M. perakensis*.

Arrested branches bearing the umbels .3 in. long or more —

Leaves rounded at apex; berry .2 in. in diam. .. . 4. *M. Wrayi*

Leaves emarginate at apex; berry 3 in. in diam .. . 5. *M. umbellulata*

1 MYRSINE AVENIS, A. DC. in Trans. Linn. Soc. XVII. 107 (1834). A small tree; branches pale, rounded; branchlets wrinkled when dry, faintly ferruginous-tomentose, leaf-buds long acuminate. *Leaves* entire, chartaceous; oblong-lanceolate, bluntly acute at apex, acutely narrowed at base, glabrous, marked with resinous often very conspicuous lineoles and dots along the margin especially near the apex, margins usually recurved; 1 to 2.5 in. long, .5 to .75 in. broad; mid-rib prominent, impressed above; main-nerves very obscure as are the reticulations; petiole .2 in. long, slender, edged with the ciliate margins of the decurrent blade. *Flowers* in compact sessile 2-5-flowered umbels on very short thick arrested branches, bracts oblong acute; pedicels about .1 in. long, angular; flower-buds ovate, flowers 5-merous. *Calyx-lobes* triangular, acute, ciliate, with few round glandular dots; tube as long as lobes. *Corolla-lobes* imbricate, elliptic, pubescent on the margins, sparsely round-gland-dotted, connate for about one-third of their length. *Stamens* as long as corolla-lobes; anthers

ovate, apiculate, pubescent at tip; filaments and lower part of anthers attached about half-way up the corolla-lobes. Ovary rounded, conical, style short in ♂, oblique and with long channelled stigma in ♀. Berry globose, .1 in. in diam., glandular, smooth, tipped with the persistent style. DC. Prod. VIII. 96; Miq. Pl. Jungh. 189, and Fl. Ind. Bat. II. 1015; Scheff. Myrs. 47; Koord. & Val. Bijdr. V. 234. *Myrsine capitellata*, Wall var. *avenis* Clarke in Hook. f. Fl. Br. Ind. III 512 (*in part*); Stapf in Trans. Linn. Soc. Ser. 2, IV. 199. *Ardisia avenis*, Blume Bijdr. 691. *Rapanea avenis*, Mez Monog. Myrs. 357.

SINGAPORE. Ridley 253.—DISTRIB. Java, Celebes, Borneo.

2. MYRSINE PORTERIANA, Wall. Cat. 6525 (1829). A shrub or small tree; branches grey, rough; branchlets slender, angled when dry, leaf-buds lanceolate. Leaves chartaceous, entire; oblong-lanceolate, bluntly acute and slightly emarginate at apex, cuneately narrowed at base, glabrous, glandular dotted, especially along the margin, and often glandular-lineolate, black or greyish when dry; 1.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerves 8 to 12 pairs, the lowest pair running parallel to the midrib and there joined by the rest, not always easily seen; secondary nerves few, slender, reticulations minute; petiole slender, .2 to .4 in long, channelled above by the decurrent and almost connivent, slightly fimbriate, edges of the blade. Flowers in compact sessile umbels on the summit of a short thick cone-like bracteate arrested branch about .1 to .3 in. long; bracts ovate, bracteoles oblong, blunt, ciliate, pedicels angled .1 in long; flower-buds ovate, flowers greenish-white, usually dioecious, 5-merous. Calyx-lobes ovate acute, .05 in long, ciliate, marked with prominent dark round or lineolate glands; tube as long as lobes. Corolla-lobes oblong obtuse, .1 to .15 in long, minutely pubescent on the margins, marked by prominent dark rounded and lineolate glands, connate to one-fourth of their length, revolute in flower. Stamens inserted on the corolla, the filaments and lower half of the anthers adnate with it, those of ♂ flowers ovate apiculate, those of ♀ flowers sagittate; in open flowers exsert, longer than the revolute lobes. Ovary ovoid, glabrous, ♂ flowers with a short straight style, ♀ flowers with an oblique style and oblique folded stigma. Berry globose, glabrous, .1 in. in diam., dark blue when fresh, pale when dry, striate from the elongated vertical glands. A. DC. in Trans. Linn. Soc. XVII. 106, Prod. VIII. 95. *M. capitellata* var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (*in part*). *Rapanea Porteriana*, Mez Monog. Myrs. 358.

PENANG: Porter in Wallich 6525; Mangay (K.D.) 1005; Curtis 1013, 3728, on Government Hill, road to Crag. PERAK: Ridley 2992; Wray 678, 1537; King's Collector 5001, usually at 5,000 feet eleva-

tion PAHANG *Ridley* 1669A SELANGOR *Ridley* 8208. MALACCA .  
*Griffith* (K D ) 3543 , *Ridley* 10076, on Mount Ophir

3 MYRSINE PERAKENSIS, King & Gamble, n sp A tree , branchlets thick, smooth, wrinkled when dry, terminal leaf-buds lanceolate *Leaves* entire, coriaceous , oblong, bluntly acute at apex, narrowed at the base, glabrous, shining above, margins recurved, glandular dots many, inconspicuous , 4 to 5 in long, 1 5 to 2 in broad , midrib thick, very prominent, main-nerves 20 to 26 pairs, prominent above, at about two-thirds of a right angle with the midrib, parallel at first, arching afterwards to meet near the margin , secondary nerves similar but more slender, reticulations prominent, petiole 3 in long, very thick, winged by the decurrent margins of the blade *Flowers* in compact sessile umbels on the summit of a thick, cone-like, bracteate, arrested branch about 1 in long, in the axils of the leaves or below them on the current year's wood, so forming a thick cluster below the terminal leaves umbels 5-8-flowered, pedicels 15 to 2 in long, thick and angular when dry , bracts ovate, scaly, sometimes ciliate *Calyx-lobes* ovate acute, glandular ciliate, about 05 in long, ciliae jointed *Corolla* and *Stamens* unknown *Berry* globose, sometimes conical at top, 1 to 15 in in diam, pericarp pale brown when dry, striate with obscure oblong glands

PERAK *Wray* 3856 , *Scortechini*, 766, at 5,000 feet elevation

4 MYRSINE WRAYI, King & Gamble, n sp A tree, branchlets stout, striate when dry *Leaves* entire, coriaceous, elliptic-oblong, rounded at the apex, narrowly cuneate at base , 3 to 5 in long, 1 to 1 75 in broad, glabrous, midrib slender, main nerves very obscure, about 12 pairs, meeting in an intramarginal nerve near the edge, reticulations many, somewhat raised beneath when dry, petiole 5 to 7 in long, bordered above by the decurrent margins of the blade, wrinkled at the base *Flowers* in peduncled axillary few-rayed umbels , bracteoles minute, triangular, peduncles 3 to 5 in long , rays of umbel 3 to 4, pedicels about 35 in long, clavately thickened above *Calyx-lobes* triangular ovate, glandular-ciliate, acute, 05 in long *Corolla* and *Stamens* unknown *Fruit* round, 2 in in diam , crowned by the persistent base of the style , pericarp rugosely striate

PERAK *Wray* 232, at 4,500 feet

5 MYRSINE UMBELLULATA, A DC in Trans Linn Soc XVII 135 (1834) A small tree , branchlets thick, glabrous, reddish-brown *Leaves* entire, coriaceous , elliptic-obovate, obtuse and emarginate at apex, acute at the base, glabrous above, rusty beneath, black glandular dots frequent, margins often recurved , 2 to 3 5 in long, 75 to 1 25 in broad , midrib prominent, slender , main-nerves inconspicuous, slender, raised on upper surface, depressed on lower, reticulations , obscure ,

petiole 3 to 5 in. long, rugose, bordered above by the decurrent margins of the blade *Flowers* in axillary scattered umbels on thick cone-like bracteate arrested branches, about 15 in long, pedicels very slender, 3 to 4 in long, glabrous *Calyx* lobes ovate, acute, very shortly ciliate, minute, recurved in fruit *Corolla* and *Stamens* unknown *Berry* globose, 3 in in diam, smooth, pale when dry, crowned with the persistent style A DC Prod VIII 95, Miq Fl Ind Bat II 1014 *M. capitellata*, var *avenis*, Clarke in Hook f Fl Br Ind III 512 (in part) *Embelia umbellulata*, Wall Cat 2312 *Rapanea umbellulata*, Mez Monog Myrs 362

SINGAPORE *Wallich* 2312 —DISTRIB Sumatra, Borneo

### 3 EMBELIA, Burm

Small trees or shrubs, usually climbing, often extensively *Leaves* alternate, entire dentate or serrulate, usually glandular, petiole often margined *Flowers* in axillary or terminal racemes, simple or paniculate white or pink, hermaphrodite or polygamo dioecious *Calyx* free 4-5 lobed, persistent the lobes rounded or ovate *Corolla* 4-5 lobed, the lobes imbricate or contorted, tube none or short *Stamens* 4 to 5 filaments short or elongate, inserted on the corolla, anthers ovate oblong, obtuse or acute staminodes none *Ovary* ovoid, globose or conical, style short, stigma capitate, ovules few, inserted on a sub globose placenta *Fruit* a small drupe, globose, 1 seeded, crowned by the persistent style *Seed* ovoid hollowed at the base albumen pitted, embryo transverse, curved —DISTRIB About 60 species, in the tropical regions of the Old World

Inflorescence terminal or terminal and axillary paniculate —

Petals free (Sect I EMBELIA) —

Leaves membranous or chartaceous —

Main nerves of leaves slender not prominent —

Petals sparingly villous anthers with a cluster of black warts behind

1 *L. Ribes*

Petals densely villous anthers with only small glandular warts behind —

Leaves elliptic 1 5 to 2 in broad shortly acuminate

2 *E. canescens*

Leaves oblong, 7 5 in broad long but obtusely acuminate

3 *E. dasythyrea*

Main nerves of leaves prominent —

Branches slender, leaves lanceolate acuminate, flowers densely villous

4 *E. Scortechinii*

Branches stout leaves suddenly acuminate, flowers glabrous or slightly pubescent only

5 *E. penanquana*

Leaves coriaceous —

Panicles long leaves moderately thick —

Leaves acute or cuneate at base, main nerves conspicuous, bracteoles as long as the pedicels

6 *E. pergamenea*

- Leaves rounded or cordate at base, main-nerves very prominent, bracteoles shorter than the pedicels .. .. 7. *E. coriacea*.  
 Panicles short, stout, leaves very thick .. .. 8. *E. angulosa*.  
 Petals joined at the base into a tube (Sect. II. *GRENACHERIA*):—  
 Leaves rusty-villous beneath, bracts of the inflorescence short, inconspicuous .. .. 9. *E. Lampani*.  
 Leaves pubescent or nearly glabrous beneath, bracts of the inflorescence long, often leafy, conspicuous .. .. 10. *E. amentacea*.  
 Inflorescence axillary.—  
 Inflorescence paniculate, axillary, 1 to 2 in. long (Sect. III. *PATTARA*) .. .. 11. *E. Ridleyi*.  
 Inflorescence much shorter than the leaves, on very short racemose branchlets with many bracts (Sect. IV. *MICREMBELIA*):—  
 Flowers tetramerous, leaves coriaceous .. .. 12. *E. Myrtilus*.  
 Flowers pentamerous, leaves chartaceous .. .. 13. *E. parviflora*.  
 SPECIES IMPERFECTLY KNOWN: 14 *E. lucida*. 15. *E. macrocarpa*.

1. *EMBELIA RIBES*, Burm. Fl. Ind. 62. t. 23 (1768). An evergreen climbing shrub; branches pale brown, with thick bark studded with conical protuberances, branchlets pale brown, smooth, lenticellate. *Leaves* entire, chartaceous, elliptic or elliptic-lanceolate, obtusely acuminate at apex, cuneate at base; glabrous above, glabrous or minutely pubescent beneath, glandular dots scattered, sometimes obscure, margin generally recurved, 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, prominent below, generally impressed above, main-nerves obscure, irregular, slender, 12 to 14 pairs, parallel at first then curved upwards to join near the margin; secondary nerves many faint, reticulations very obscure; petiole 3 to 5 in. long, bordered by the crisped edges of the decurrent blade. *Inflorescence* a large terminal leafy 3-pinnate grey- or rusty-pubescent panicle of racemes, the branches at first turning upwards, afterwards nearly at right angles with the rachis; bracts leafy, smaller by degrees upwards; bracteoles subulate, shorter than the slender pedicels, .05 in. long; buds small, globose; flowers white. *Calyx-lobes* very minute, about .025 in. long, triangular-acute, ciliate, with few glandular dots, tube as long as lobes. *Corolla-lobes* free, elliptic, rounded at top in ♀, more acute in ♂, .05 in. long, ciliate, sparingly villous-pubescent, apex incurved, with few prominent glandular dots. *Stamens* inserted on the corolla-lobes, about half-way up in ♂, lower down in ♀, shorter than the lobes; anthers short, ♂ with parallel, ♀ with divaricate, cells, both with a long black mass of glandular warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous; style short, stigma capitate in ♂, peltate and larger in ♀. *Berry* globose or sometimes pyriform, red or black, glabrous, succulent, wrinkled when dry, aromatic, .1 to .15 in. in diam., crowned with the persistent style and

stigma. Retz. Obs. iv. 24; Lamk. Ill. t. 133; Roxb. Fl. Ind. i. 586; Wall. Cat. 2304; A. DC. in Trans. Linn. Soc. XVII. 129, Prod. VIII. 85 (part); Scheff. Myrs. 38; Miq. Fl. Ind. Bat. II. 1011; Dalz. & Gibs. Bomb. Fl. 137; Brandis For. Fl. 284, Kurz For. Fl. II. 101; Clarke in Hook. f. Fl. Br. Ind. II. 513; Trimen Fl. Ceyl III. 69, Cooke Bomb. Fl. II. 84; Mez Monog. Myrs. 303; Prain Beng. Pl. 643. *E. Burmanni*, Retz Obs. IV. 23. *E. garciniaefolia*, Wall. Cat. 2304c and e; Miq. l.c. 1011; Scheff. Myrs. 40. *E. sumatrana*, Miq. l.c. 1012. *E. glandulifera*, Wight Ic. 1207; Dalz. & Gibs. Bomb. Fl. 137. *Samana Ribes*, Kurz in Journ. As. Soc. Beng. XLVI. 222. *Ardisia tenuiflora*, Bl. Bijdr. 687.

PENANG: *Deschamps, Curtis*. PERAK: *Wray* 420; *Scortechini*; *King's Collector* 928, 1150, 6999 (abnormal state, most of the flowers converted into leafy bracts). MALACCA: *Griffith* (K.D.) 3550; MAINGAY (K.D.) 1002; *Cuming* 2320. JOHORE: *Native Collector* 3749. SINGAPORE *Ridley* 10643, 2803 (fruits converted into insect galls), *Kurz* 2965 — DISTRIB. India, Burma and Ceylon; Malay Islands and eastwards to South China.

VAR. *rugosa*, King & Gamble. Branchlets dark brown, much wrinkled and with oblong lenticels. *Leaves* 4 to 5 in. long, 1.5 to 2 in. broad, usually thicker than the type. *Racemes* less pubescent than in type, the flowers often collected near the ends of the ultimate branches of the inflorescence. *Stamens* of ♂ flowers exsert. *Stigma* of ♀ much larger than that of ♂ flowers, peltate. *Berry* rugose, conically tipped; pericarp thick, fleshy, with cavities.

PERAK: *Wray* 2278, 2576, 3069; *King's Collector* 2512, 3001, 4040. SINGAPORE: *Ridley* 10384.

We find no Malay specimens with the large glandular pits so well marked in South Indian specimens (*Embelia glandulifera*, Wight Ic. 1207). Wight's figure is not well drawn in several respects, and especially as to the nervation of the leaves, so it is not very easy to make sure about it, but there seems no reason to separate *E. glandulifera* from *E. Ribes* unless perhaps as a variety. It has usually a much shorter and fewer-flowered inflorescence.

2. *EMBELIA CANESCENS*, Jack; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 292 (1824). A climbing shrub with slender, villous, sub-flexuose branches. *Leaves* entire, chartaceo-membranous; elliptic, shortly acuminate at apex, rounded or sub-cordate at base, glabrous or slightly pubescent and shining above, canescent beneath; glandular dots many, not prominent, in the areoles of the reticulations; 2 to 3.5 in. long, 1.5 to 2 in. broad, midrib prominent, impressed above, villous beneath; main-nerves about 10 pairs, irregular, curving upwards to join at some distance from the margin; secondary nerves many, slender,

reticulations irregular; petiole .3 to .4 in. long, bordered above by the prominently crispate edges of the decurrent blade, rugose beneath. *Inflorescence* a slender terminal 3-pinnate leafy panicle of distant comparatively few-flowered racemes, 4 to 8 in. long; rachis and its branches densely rusty-villous; bracts leafy below, spatulate above, bracteoles subulate, deciduous, about half as long as the .05 to .1 in. long pedicels which are longer in fruit; buds very minute, globose. *Calyx-lobes* very small, triangular, pubescent; tube as long as lobes. *Corolla-lobes* oblong, free, blunt, .06 in. long, densely villous without, papillose within and glandular-dotted. *Stamens* shorter than the corolla-lobes, inserted near their base; anthers rounded, warted with inconspicuous glands behind at the insertion of the dorsifixed filaments. *Ovary* in ♂ flower rudimentary. *Berry* globose, somewhat conical above, rugose when dry, crowned with the remains of the persistent style, .2 in. in diam. Wall. Cat. 2311; A. DC. Prod. VIII. 85, Scheff. Myrs. 42; Miq. Fl. Ind. Bat. II. 1012; Clarke in Hook. f. Fl. Br. Ind. III. 514; Mez Monog. Myrs. 305.

PENANG *Jack; Porter*. PERAK: *Ridley* 7172 (part). MALACCA: *Mangay* (K.D.) 1004. SINGAPORE: *Goodenough* 2804; *Hullett* 115.

3. *EMBELIA DASYTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub; branches minutely pubescent, striate, with prominent raised lenticels; branchlets dark, slender, rusty-villous. *Leaves* entire, chartaceous, oblong or elliptic-oblong, bluntly acuminate at apex, rounded at base; glabrous above, glabrous except on the midrib beneath, glandular dots scattered, obscure; 1.5 to 2 in. long, about .75 in. broad; midrib prominent beneath, villous, impressed above, main-nerves 10 to 12 pairs, irregular, arching upwards to meet near the margin, secondary nerves few, slender, reticulations obscure; petiole .1 to .2 in. long, channelled above. *Inflorescence* a long, 3-pinnate, leafy panicle of long slender many-flowered racemes, rachises minutely pubescent; bracts leafy, bracteoles subulate, minute, much shorter than the .1 in. long very slender pedicels, buds globose shaggy, flowers grey. *Calyx-lobes* minute, about .03 in. long, triangular, ciliate; tube shorter than lobes. *Corolla-lobes* free, ovate-spatulate, about .06 in. long, black-gland-dotted, densely covered with short moniliform hairs. *Stamens* less than half the length of the corolla-lobes, inserted at the base, anthers reniform, with inconspicuous glandular warts on the back at the insertion of the dorsifixed filaments, which are almost shorter than the anthers. *Ovary* ovoid, style very short, stigma in ♂ small capitate, in ♀ peltate, large. *Berry* red or black, .15 in. in diam., globose or slightly pyriform, wrinkled when dry, tipped by the persistent style and stigma. Scheff. Myrs. 42; Mez Monog. Myrs. 305.

PERAK Wray 1924, *Scortechini* 498, King's Collector 776, 4103, 4375, 5102, 5762, 6640, 8588, 10024, 10701, clinging to trees in dense jungle at low levels SELANGOR Radley 7572 SINGAPORE Hullett 118 —DISTRIB Bangka, *Teysmann* Hort Bogor No 3189, at Djeboes

Only one very poor specimen of the type (*Teysmann's*) is available, but from an examination of it and from Miquel's description it seems to be right to refer the Peninsular plant, which we had considered new to this species

4 *EMBELIA SCORTECHINII*, King & Gamble, n sp A climbing shrub (?), branches slender, ultimate branchlets reddish, rusty villous. *Leaves* entire, chartaceous, elliptic-lanceolate, long acuminate at apex, narrowed at base, glabrous above, grey-pubescent on the nerves beneath and with minute white scales, glandular dots obscure, 4 to 5 in long 1.5 to 2 in broad, midrib very prominent, impressed above main nerves about 8 pairs, prominent, slender, curving upwards to and along the margin, reticulations many, prominent on the upper surface petiole .2 in long, pubescent *Inflorescence* of slender rusty-villous panicles of long racemes, the panicles 7 to 10 in long, racemes 3 to 6 in, rachis hirsute, somewhat angular, bracts deciduous, bracteoles very minute subulate, buds very small, globose *Calyx lobes* ovate, rounded, very minute, the edges ciliate with long moniliform hairs, tube very short *Corolla lobes* oblong, acute, .05 in long, shaggy with long moniliform hairs *Stamens* shorter than the corolla lobes, anthers ovate, cordate, with two prominent papillose warts behind at the insertion of the dorsifixed very short filaments *Ovary* ovoid, style conical *Berry* not known

PERAK *Scortechini*

This interesting species is characterised by the abundant moniliform hairs on the flowers, longer and more conspicuous than in other species

5 *EMBELIA PENANGIANA*, Mez Monog Myrs 311 (1901) A climbing shrub, stem reaching about 1 in in diam, branches stout, ultimate branchlets red, striate, lenticellate *Leaves* entire, chartaceous, elliptic, shortly acuminate at apex, narrowly cuneate at base, glabrous, not gland dotted, 3.5 to 4.5 in long, 1.5 to 2 in broad, midrib prominent, impressed above, main nerves 10 to 12 pairs, irregular, slender, at about two-thirds of a right angle with the midrib at first then arching upwards to join near the margin secondary nerves similar but less prominent, reticulations many, petiole .5 in long, slender, edged by the crispate decurrent margins of the blade which are often connivent above *Inflorescence* a terminal 3 pinnate leafy panicle, 6 to 9 in long, of slender racemes rachis slightly pubescent, main branches at about half a right angle with rachis, peduncles about 1 in long, upper branches and branchlets usually at right angles, bracts lanceolate spatulate, leafy, deciduous,



bracteoles subulate, as long as or rather longer than the very short, under .05 in. long pedicels; buds very small, globose, flowers red. *Calyx-lobes* orbicular, glandular-ciliate, .05 in. long, connate to the middle, not gland-dotted. *Corolla-lobes* 5, free, ovate, rounded at apex, .075 to .1 in. long, slightly pubescent without, papillose within, not gland-dotted. *Stamens* of ♂ flowers equal to or longer than the corolla-lobes, of ♀ flowers shorter than them, inserted near the base of the lobes; anthers oblong, emarginate, with minute black warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous, style very short, stigma peltate. *Berry* globose, red, tuberculate and corrugate, .1 in. in diam., fruiting pedicels as long as berry. *Embelia Ribes* var. *penangiana*, Oliv. in Hook. Ic. Pl. t. 1597.

PENANG: *Curtis* 306. PERAK: *Wray* 1375, 1409; *Scortechini*; *King's Collector* 3637, 10739.

A well-marked species, distinguished by the fairly prominent nerves of the leaves, the very short pedicels, and the absence of glandular dots.

6. *EMBELIA PERGAMACEA*, A. DC. Prod. VIII. 85 (1844). A slender climbing shrub; branches rather thick, branchlets wrinkled and angular when dry. *Leaves* entire, coriaceous; oblong-lanceolate, acuminate at apex, cuneate or acute at base; glabrous, shining above, pale beneath, margins recurved, glandular dots many, hardly prominent; 3 to 5 in. long, 1.5 to 2 in. broad, midrib thick, impressed above, main-nerves slender 12 to 14 pairs, parallel but irregular, raised and conspicuous on the upper surface, leaving the midrib at about two-thirds of a right angle and joining near the edge in an intramarginal nerve, secondary nerves many, parallel to the main-nerves, reticulations obscure; petiole .3 in. long, angular, channelled above when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal, pyramidal, 4-pinnate, nearly glabrous, leafy panicle with racemose branchlets and very numerous flowers; main rachis thick, flattened above, branches nearly at right angles to rachis as again are the branchlets, all angular; bracts ovate spatulate, leafy, bracteoles subulate acuminate as long as the pedicels, pedicels .05 in. long, somewhat longer in fruit; buds very small, globose, flowers light red. *Calyx-lobes* minute, about .04 in. long, broadly triangular, acute, glandular-ciliate, papillose on both sides, dotted with few large and small brown and black glands, tube as long as lobes. *Corolla-lobes* free, ovate-oblong, glandular-ciliate, glabrous without, papillose within, dotted in upper part only, .07 in. long. *Stamens* as long as or shorter than corolla-lobes, inserted half-way up, anthers ovate cordate, emarginate, black-warted behind at the insertion of the dorsifixed filaments. *Ovary* glabrous, ovoid; style thick very

short; stigma capitate. *Berry* globose, blue when ripe, wrinkled when dry, .06 in. in diam., crowned with the persistent style, gland-dotted. Miq. Fl. Ind. Bat. II. 1012; Scheff. Myrs. 34; Mez Monog. Myrs. 310. *Ardisia pergamacea*, Bl. fide A. DC.

PERAK: Curtis 2029; Wray 2001; King's Collector 3658, 4678, 6412.—DISTRIB. Java; Borneo.

This species closely resembles *E. coriacea*, but differs in the acuminate leaves, very shining above and prominently nerved; in the papillose calyx-lobes, petals dotted only in the upper part and bracteoles as long as the pedicels

7. *EMBELIA CORIACEA*, Wall. Cat. 2314 (1829). A climbing shrub, branches reaching 1.5 in. in diam.; branchlets reddish, twisted, somewhat angular, roughly lenticellate. *Leaves* entire, coriaceous, oblong or oblong-lanceolate, obtusely acute at apex, rounded or almost cordate or auricled at base; glabrous, more or less shining above, brownish beneath, glandular dots scattered, not prominent, margin sometimes incurved; 3 to 10 in. long, 1.5 to 4 in. broad; midrib thick, impressed above, main-nerves many, slender, not prominent, irregularly parallel, at about two-thirds of a right angle with the midrib, joining in an intramarginal faint nerve; secondary nerves many, slender, reticulations faint; petiole thick, 3 to .7 in. long, channelled when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal 4-pinnate spreading leafy rusty-pubescent panicle with racemose branchlets and very numerous flowers; main rachis thick, somewhat flattened, branches nearly at right angles to rachis as again are the branchlets; bracts leafy, decreasing upwards, bracteoles minute, subulate, about half the length of the pedicels; pedicels .05 in. long; buds very small, globose, flowers grey. *Calyx-lobes* 5, minute, triangular, glabrous, dotted with very few (3 to 5 per lobe) brown or black glands; tube as long as lobes. *Corolla-lobes* free, 4-5, ovate, blunt, recurved, glabrous without, slightly papillose within, gland-dotted all over. *Stamens* shorter than the corolla-lobes, inserted on them about half-way up; anther-cells oblong, somewhat divaricate, with about 4 black warts behind at the insertion of the short filaments. *Ovary* ovoid, style very short, stigma capitate. *Berry* globose, smooth, .075 to .1 in. in diam., pale, prominently gland-dotted, wrinkled when dry, crowned with the persistent base of the style. A. DC. in Trans. Linn. Soc. XVII. 135, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 513; Mez Monog. Myrs. 313. *E. oblongata*, Miq. Fl. Ind. Bat. Suppl. 573; Scheff. Myrs. 34. *E. macrophylla*, Bl.; Scheff. Myrs. 36.

PENANG: Wallich 2314; Curtis 1047. PERAK: Curtis 1307, Derry 11712; Wray 2001, 2579, 3238; Scortechini 117, 255; King's Collec-

tor 2278, 3481, 4976, 5056, 5254, 5323, 6231, 6766, 7857, 10015, 10548. PAHANG: *Ridley* 5828. SELANGOR: *Ridley* 7562. MALACCA: *Maingay* (K.D.) 1018; *Ridley* 11135. SINGAPORE: *Ridley* 2812.—DISTRIB. Sumatra; Java; Borneo, *Beccari* 767, 878, 1189, 2561, 3922; *Haviland* & *Hose* 3469.

8. *EMBELIA ANGULOSA*, King & Gamble, n. sp. A climbing shrub; branches thick, branchlets wrinkled when dry, lenticels few. *Leaves* entire, coriaceous; ovate, obtuse, emarginate, glabrous, shining above, dull beneath, glandular dots pitted on both surfaces; 2 to 3·5 in. long, 1 to 2 in. broad; midrib very thick and prominent, impressed above; main-nerves 14 to 16 pairs, slender, irregular, leaving the midrib at nearly a right angle, then curved and joining near the margin, raised on upper surface; secondary nerves many, slender, reticulations obscure; petiole ·2 in. long, channelled above and bordered by the crispate edges of the decurrent blade. *Inflorescence* a dense terminal glabrous stiff panicle about 4 in. long and broad, of racemes, the rachises sharply angled; bracts leaf-like, spatulate, bracteoles very small, subulate; pedicels ·05 in. long, thick, angular, glabrous or minutely pubescent, equal to or shorter than the bracteoles; buds globose *Calyx-lobes* ovate, ciliate, minute, ·03 in. long, not gland-dotted. *Corolla-lobes* free, ovate, acute, ·075 in. long, nearly glabrous outside, papillose within. *Stamens* shorter than corolla-lobes, inserted one-third up, reniform, with inconspicuous black dots at the insertion of the short dorsifixed filaments. *Ovary* ovoid glabrous; style very short; stigma peltate. *Berry* red, ovoid, somewhat pyriform, ribbed and gland-dotted, glabrous, crowned with the remains of a cylindric style and capitate stigma. *E. coriacea*, Stapf in Trans. Linn. Soc. Ser. ii. IV. 200 (not of A. DC.)

PERAK: *Wray* 1524—on Ulu Batang Padang at nearly 5,000 ft.—DISTRIB. Borneo, *Haviland* No. 1152, on Mt. Kinabalu at 7,600 to 8,800 feet.

The description of the flowers is taken from *Haviland's* Borneo specimen, the rest from *Wray's*.

9. *EMBELIA LAMPANI*, Scheff. Myrs. 37 (1867). A slender climbing shrub, clinging to trees; branches reddish-brown, rough with strigose hairs, lenticellate; branchlets rusty-villous-hairy. *Leaves* chartaceous; oblong, obtuse or emarginate at apex, rounded or cordate at base; margins recurved, upper surface glabrous except on the midrib, lower surface rusty-villous, glandular dots many, scattered; 1·5 to 3·5 in. long, 1 to 1·5 in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves many (up to 24 pairs), irregular, at about two-thirds of a right angle with the midrib, straight at first then curving

upwards to meet in a nerve more or less parallel to the margin; secondary nerves similar, reticulations many; petiole .1 to .2 in long, rusty-villous. *Inflorescence* of terminal panicles of pedunculate racemes 6 to 12 in. long, the branches often leafy, rachis and peduncles all rusty-villous; peduncles .5 to 7 in. long, pedicels slender, about .05 in. long, bracts few, leaf-like; bracteoles rather longer than the pedicels, lanceolate to spatulate; flowers small, buds globose, petals white, striate, tube red. *Calyx-lobes* 5-6, ovate, acute, ciliate on the edges, villous, dotted with few glands; tube as long as lobes, both together .05 in. long, longer in fruit. *Corolla* gamopetalous from one-third to one-half of its length, lobes oblong, obtuse, recurved, .1 in. long, sparsely gland-dotted. *Stamens* as long as or a little shorter than the corolla-lobes, inserted about half-way up, anthers oblong, dehiscing longitudinally, the back with black conspicuous glandular warts; filaments adnate to the corolla below point of insertion, slender, dorsifixed. *Ovary* rounded, glabrous, style cylindric, stigma peltate in ♀, slightly lobed in ♂. *Berry* globose, .1 to .15 in. in diam., black when dry, crowned with the persistent style, rugosely glandular. Clarke in Hook. f. Fl. Br. Ind. III. 514. *E. villosa*, Wall. Cat. 2313 (in part). *Grenacheria Wallichiana*, Mez Monog. Myrs 293, fig 49. *G. Lampang*, Mez l c. 294

PENANG: *Curtis* 305, *G. King*. PERAK: *Wray* 95, 2784; *Scortechini* 231; *King's Collector* 2483, 4210, 6849, 8134. SELANGOR. *Ridley* 10224. MALACCA: *Maingay* (K D.) 1003. SINGAPORE *Ridley* 10417.—DISTRIB. Sumatra, Korthals, Borneo, Haviland & Hose.

Haviland and Hose's Borneo specimens have rather larger flowers than, and pedicels about twice as long as, those from the Peninsula (No. 2280).

10. *EMBELIA AMENTACEA*, Clarke in Hook. f. Fl. Br. Ind. III. 514 (1882). A slender climbing shrub; branches pale brown, velvety; branchlets cinnamomeous or rusty-villous. *Leaves* chartaceous; oblong or obovate-oblong, obtuse and sometimes emarginate at apex, rounded at base; upper surface sparsely pilose, under surface pubescent, pale bluish-green, glandular dots many prominent; 2 to 3 in. long, .75 to .1 in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves few, 6 to 10 pairs, irregular, at about two-thirds of a right angle with the midrib, arching upwards, branching and joining in a nerve near the margin; secondary nerves similar but more slender, reticulations not prominent; petiole .15 in. long, villous, winged by the decurrent base of the blade. *Inflorescence* of terminal panicles of pedunculate racemes, the branches leafy, the leaves passing gradually into oblong or spatulate conspicuous bracts; peduncles 1 to 1.5 in. long, enlarged at base; pedicels .1 in. long, supported by linear subulate bracteoles twice their

length, so that when in bud the racemes have the appearance of catkins; flowers very small, buds globose. *Calyx-lobes* 5, acute, ciliate on the edges, gland-dotted, tube as long as lobes, both together .05 in. long. *Corolla* very shortly gamopetalous; lobes 5, ovate, obtuse, glabrous within, .05 in. long. *Stamens* very short, shorter than corolla-lobes, inserted about half-way up; anthers oblong, rounded, with black papillose warts on the back; filaments as long as anthers, dorsifixed. *Ovary* rounded, glabrous, conical above, style slender, stigma peltate. *Berry* globose, wrinkled when dry, .1 to .125 in. in diam., crowned with the persistent style and stigma, black when dry. *Grenacheria amentacea*, Mez Monog. Myrs 294.

PERAK: *Scortechini* 802, *Ridley* 7172 (part); *King's Collector* 5055, 6280, 6817, 8692—in open ground and in bamboo forests. SELANGOR: *Ridley* 7561, *Native Collector* 2802A, *Goodenough* 10555. MALACCA: *Griffith* (K.D.) 3548.

Mez suggests that this may be a young state of *Grenacheria Walluchiana*. He apparently saw only Griffith's specimen. The abundant material now available clearly shows that Clarke correctly considered it as separate. The curious catkin-like young inflorescence and the more sparse leaf-venation distinguish it.

11. *EMBELIA RIDLEYI*, King & Gamble, n. sp. A climbing (?) shrub; branchlets light brown, wrinkled. *Leaves* chartaceous; oblong, acute at apex, rounded at base; glabrous, glandular dots scattered obscure, margin somewhat recurved; 4 to 7 in. long, 1.5 to 3 in. broad; midrib thick, prominent below, main-nerves prominent below, about 12 pairs, curving upwards and meeting in a looped intramarginal nerve; secondary nerves and reticulations faint; petiole .5 in. long, thick. *Inflorescence* an axillary panicle of racemes, the branches curved, distant; rachis .5 to 1 in. long, that of racemes shorter, bracteoles minute, triangular; racemes about .5 in. long. *Calyx-lobes* 4 or 5, ovate, gland-dotted, very small. *Corolla* and rest not seen.

SINGAPORE: *Ridley* 6324. It seems to come near to *E. floribunda*, Wall.

*E. Tsjerum-Cottam*, A. DC. is quoted by Mez as extending from India southwards to Singapore, but we have seen no specimens from our region.

12. *EMBELIA MYRTILLUS*, Kurz in Journ. As. Soc. Beng. XL. ii. 67 (1871), and For. Fl. II. 104. A small climbing shrub (Wray); branches rough, somewhat corky, with large lenticels; ultimate branchlets densely rusty-villous. *Leaves* coriaceous, bifarious, broadly elliptic to almost orbicular, acute at apex with usually 3 terminal teeth, narrowed truncate or cordate at base; glabrous above, slightly villous on nerves beneath; glandular dots black, numerous, small, fewer large, scattered, especially

near the apex and along the margin, which is often recurved; .4 to .7 in. long, .3 to .6 in. broad; midrib prominent; main-nerves 6 pairs, arched upwards and joining in an intramarginal nerve; secondary nerves similar, reticulations prominent; petiole 1 in. long, villous. *Flowers* tetramerous, very small, in umbels or very short racemes on short axillary arrested branches, .1 to .15 in. long, shorter than the leaves; bracts minute, subulate. *Calyx-lobes* ovate, glandular ciliate, densely papillose within, .05 in. long, tube very short. *Corolla-lobes* free, oblong, rounded at apex, .1 in. long, glandular-ciliate on the edges, conspicuously marked with black, oblong or linear glands. *Stamens* longer than the corolla-lobes in ♂ flowers, shorter in ♀; anthers oblong, often cordate, with conspicuous warts at the insertion of the dorsifixed filaments which spring from the base of the petals. *Ovary* ovoid; style slender, stigma capitate, 4-cleft. *Berry* globose, red or black, .15 to .2 in. in diam., prominently gland-dotted, tipped with the persistent style and stigma. Clarke in Hook. f. Fl. Br. Ind. III. 516; Mez Monog. Myrs. 322 *Myrsine Myrtillus*, Hook. Ic. Pl. t. 825. *Samara Myrtillus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223.

PERAK: *Scortechini* 762; *Wray* 1565, 3818, on Gunong Bubu and Gunong Brumber, at 5,000 to 7,000 feet. MALACCA: summit of Mount Ophir, *Griffith* (K.D.) 3542; *Lobb*; *Ridley*.—DISTRIB. Burma, *Griffith*.

13. *EMBELIA PARVIFLORA*, Wall. Cat. 2307 (1829). A slender climbing shrub reaching 60 feet in length, branches and branchlets densely rusty-villous, slender. *Leaves* chartaceous; distichous, ovate, obtusely acute at the apex, truncate at base; glabrous except on the midrib beneath, margin slightly recurved; glandular dots many, prominent, scattered, more numerous towards the apex; 7 to 1.5 in. long, .5 to .75 in. broad, midrib prominent beneath, impressed above; main-nerves 8 to 10 pairs, slender, curving upwards towards the margin; secondary nerves slender, many, reticulations prominent; petiole scarcely .05 in. long, rusty-villous, channelled above. *Inflorescence* of very short axillary few-flowered subumbellate racemes, ♂ 4–6-flowered with .15 in. long slender pedicels, ♀ 1–3-flowered with .05 in. slender pedicels; bracts in both minutesubulate; flowers pentamerous, buds globose. *Calyx-lobes* oblong, fimbriate-ciliate, .05 in. long, with few (about 6) large brown glands, glandular-villous without, tube very short, ciliæ moniliform. *Corolla-lobes* ovate, rounded, ciliate, .075 in. long, .05 in. broad, with few unequal-sized prominent brown glands. *Stamens* in ♂ flowers longer than corolla-lobes, in ♀ much shorter; anthers reniform, in ♂ apiculate and warted at back at the insertion of the dorsifixed, rather long filaments which spring from near the base of the corolla-lobes. *Ovary*

rounded, glabrous; style slender, curved, stigma peltate, at any rate in ♀. *Berry* globose, red, black when dry, smooth, .15 to .2 in. in diam., surmounted by the remains of the style and stigma. A. DC. in Trans. Linn. Soc. XVII. 130 (excl. var. β), Prod. VIII. 86: Scheff. Myrs. 44; Kurz For. Fl. II. 104; Clarke in Hook. f. Fl. Br. Ind. III. 515; Mez Monog. Myrs. 324. *Samara parviflora*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223. *Celastrinea*, Griff. Itin. Notes 85, n. 1226.

PERAK: *Scortechini*; Wray 4194—at Maxwell's Hill, Larut, 3,500 feet; Curtis 2059—on Hijan Range; King's Collector 2342, 6992—from dense forests on high hills at 3,000 to 5,000 feet.—DISTRIB. Khasia and Naga Hills; Upper Burma, Griffith (K.D.) 3545, &c.; Sumatra.

#### IMPERFECTLY KNOWN SPECIES.

14. *EMBELIA LUCIDA*, Wall. Cat. 2315. *Leaves* 3 in. long, 1.25 in. broad, broadly oblong, suddenly narrowed at both ends, entire, glabrous, coriaceous. *Racemes* 1 in. long, axillary, simple, solitary or paired, rusty-villous. A. DC. Trans. Linn. Soc. XVII. 134, Prod. VIII. 87, Clarke in Hook. f. Fl. Br. Ind. III. 517; Mez Monog. Myrs. 396.

SINGAPORE: Wallich 2315.

15. *EMBELIA MACROCARPA*, King & Gamble, n. sp. A strong climber, branchlets thick, nearly black, rough. *Leaves* coriaceous; elliptic, obtuse or shortly acuminate at apex, almost rounded at base, glabrous, margin reflexed; 6 in. long, 3 to 4 in. broad; midrib rather slender; main-nerves irregular, distant, not prominent, about 8 pairs, secondary nerves slender, obscure as are the reticulations; petiole .7 to 1 in. long, thick, bordered above by the decurrent margins of the leaves. *Flowers* apparently on rather short, thick racemes from the branches. *Calyxlobes* 4, triangular, acute, gland-dotted, under .1 in. long. *Berry* large, .5 to .7 in. in diam., smooth, wrinkled when dry, globose, crowned with the short remains of the persistent style. *Seed* with many conspicuous pits. Rest not seen.

PENANG. at Marriot's Road, 1,500 feet, Curtis 1229.

The following Burmese species is here inserted, as it is found in Tenasserim and may occur further south in the Malay Peninsula.

*EMBELIA GALLATLYI*, King & Gamble, n. sp. Apparently a shrub; branchlets rounded, dark brown, lenticellate. *Leaves* ovate, acuminate at apex, truncate at base; prominently crenate dentate with blunt teeth and glands in the crenatures; glabrous on both surfaces, glandular dots few, chiefly near the margin; 1 to 1.4 in. long, .5 to .7 in. broad; midrib slender, impressed above; main-nerves 10 to 12 pairs; arching upwards to the crenatures; secondary nerves many, slender, reticulations prominent; petiole .1 to .2 in. long, channelled above, crispately edged. *Inflorescence* of axillary corymbose racemes, 10-12-flowered, rachis about 2 in. long, bracts minute subulate,

the whole minutely rusty-pubescent, pedicels slender. *Calyx-lobes* triangular acute .03 to .05 in. long, ciliate; tube as long as lobes or somewhat shorter. *Corolla-lobes* oblong-spathulate, .1 in. long, ciliate, minutely pubescent, sparsely gland-dotted. *Stamens* longer than corolla-lobes, .15 in., anthers oblong, cells parallel, not warted behind at the insertion of the long exsert filaments which spring from close to the base of the corolla-lobes. *Ovary* ovoid-conical, style short curved, stigma minute. *Berry* unknown

TENASSERIM: at Moolyet, 5,000 feet, *G. Gallatly* No. 407. *Gamble* No. 7906 from Mianimukh, Chittagong Hill Tracts, without flowers or fruit, is probably this species.

#### 4. LABISIA, Lindl.

Small shrubs, with a creeping rhizome and erect stem, resembling *Pothos* in appearance. *Leaves* few, coriaceous, entire or denticulate, sessile or petiolate, the petiole often dilated, main leaf-nerves very many, at right angles to the midrib. *Flowers* hermaphrodite, minute, pink, in axillary spike-like panicles, bracts very small. *Calyx* minute, 5-lobed. *Corolla* 5-lobed, lobes ovate, induplicato-valvate in bud; tube very short. *Stamens* 5, wrapped in the corolla-lobes; filaments very short, anthers ovoid, introrsely dehiscent, no staminodes. *Ovary* globose, attenuated into a short style; stigma small; ovules few, immersed in a globose central placenta. *Fruit* small, globose, red, 1-seeded. *Seed* globose, hollowed at the base; albumen smooth; embryo cylindric transverse.—DISTRIB. About 4 species, all of the Malay Peninsula and Archipelago.

Leaves petiolate without decurrent wings.—

Leaf-blades elliptic-lanceolate, much longer than broad 1 *L. pumila* var. *lanceolata*.

Leaf-blades ovate or ovate-orbicular, nearly as broad as long. . . . . 2. *L. paucifolia*.

Leaves with winged petioles or sessile —

Wings very narrow, blade of leaf acuminate at both ends . . . . . 1. *L. pumila*.

Wings broad. —  
Leaves crenate, thin, main-nerves rather distant . . 1. *L. pumila*, var. *alata*.  
Leaves entire, coriaceous, main-nerves very close and regular . . . . . 3 *L. longistyla*.

1. *LABISIA PUMILA*, Benth. & Hook. f. Gen. Pl. II. 645 (1876). A semi-herbaceous undershrub, with rooting stems and leaves not jointed at their insertion but decurrent into them. *Leaves* bluish-green, elliptic-lanceolate, acuminate, narrowed at the base, and more or less decurrent on the petiole, crenately toothed, or sometimes nearly entire; blade 5 to 8 in. long by 1 to 2.5 in. broad; midrib thick, often rusty-pubescent; main-nerves extremely numerous, nearly at right angles to the midrib, parallel, slender, anastomosing towards the margin, and



then producing an elegant network; under-surface with brown glandular scales; petiole 1 to 3 in., enlarged at the base, often minutely rusty-pubescent. *Flowers* pink, in a spike-like, long-stalked, ferruginous-tomentose panicle of small corymbose bracteate clusters; peduncles of corymbs 1 in. long or shorter, sometimes none; bract linear-subulate, .05 to 1 in. long.; pedicels .05 to 1 in., slender, with minute bracteoles. *Calyx-lobes* triangular, acute, .025 in. long, densely glandular. *Corolla-lobes* ovate, with linear glands, glabrous. *Stamens* infolded in the corolla; filaments very short; anthers oblong-linear, apiculate, with several hard round or linear black warts on the back. *Ovary* rounded, pubescent, ending in a subulate angular style with minute notched stigma. *Fruit* a globose red berry, about .15 in. in diam., ribbed and with prominent elongate glands, surmounted by the persistent style. Mez Monog. Myrs. 171 (var. *genuina*). *L. pothoina*, Lindl. in Bot. Reg. 31. t. 48; Clarke in Hook. f. Fl. Br. Ind. III. 518; Stapf in Trans. Linn. Soc. Ser. 2, IV. 200; *Ardisia pumila*, Blume Bijdr. 688; A. DC. Prod. VIII. 137; Miq. Pl. Jungh. 199 and Fl. Ind. Bat. II. 1028; Scheff. Myrs. 92. *A. ? spicata*, Wall. Cat. 2273; A. DC. in Trans. Linn. Soc. XVII. 135.

SINGAPORE or PENANG: Walker, 165. PENANG: Curtis 1192; Kunstler 1159. PERAK: *Scortechini*, Wray 753A. MALACCA: Maingay 1013 (K.D.); *Stoliczka*. SINGAPORE: Ridley 1804.—DISTRIB. JAVA: Forbes 238, 474. In dense moist forests on the lower slopes of hills.

VAR. *lanceolata*, Scheff. l.c. 93. *Leaves* elliptic-lanceolate, acuminate, somewhat rounded at base; not, or very slightly, decurrent; blade 5 to 8 in. long, by 1.5 to 3.5 in. broad; petiole 2 to 5 in. long not winged. *Inflorescence* more slender, bracts often longer than the peduncle of the corymb. Clarke in Hook. f. Fl. Br. Ind. III. 518; Mez Monog. Myrs. 172. *L. pothoina*, N. E. Brown (non Lindl.) in Ill. Hort. XXXII. 95 tab. 561.

PENANG: Hullett 201. PAHANG: Goodenough 2799. SINGAPORE: Lobb 61; Kurz; T. Anderson 196.—DISTRIB. Sumatra, Korthals; Borneo, Motley 1250, Haviland.

VAR. *alata*, Scheff. l.c. 93. *Leaves* thin ashy-green above, dark green below, elliptic oblong, rounded at top or obtusely acuminate; gradually or suddenly narrowed into a broad wing decurrent on the petiole; crenate glands and scales few or none; 6 to 16 in. long, 2 to 4 in. broad. *Inflorescence* with the corymbs usually more closely congested and on a shorter peduncle; flowers somewhat smaller, bracts usually longer than the corymb peduncle, flowers white or pink. Mez Monog. Myrs. 172. *L. alata*, N. E. Brown in Ill. Hort. XXXIII. 123, t. 605.

PERAK: Wray 753B, 824, 2482, 2737; *Scortechini*; King's Collector

980, 2815, 2882, 2891, 2942, 2974, 2999, 3376, 8325, 10949. SINGAPORE: Lobb 313.—DISTRIB. Sumatra, *Korthals*; Borneo.

2. *LABISIA PAUCIFOLIA*, King & Gamble, n. sp. A small semi-herbaceous undershrub, 10 to 15 in. high; the stems striate, round, minutely purplish-brown-pubescent, bearing rarely more than 3 to 4 leaves. *Leaves* long-petioled, the blade ovate or orbicular-ovate, rounded at top into a bluntly acute point, rounded at base and then very shortly decurrent; entire or very minutely crenate; 2.5 to 4 in. long, 1.5 to 3 in. broad; main-nerves slender, numerous, more or less parallel, joining near the edge; petiole 1 to 2 in. long, thickened at the base and decurrent into the stem. *Inflorescence* 1.5 to 2.5 in. long, consisting of axillary, short-peduncled, rusty-pubescent racemes, the flowers reflexed, single or in few-flowered sessile clusters; pedicels .05 to .1 in. long, with short subulate bracts of equal length. *Calyx-lobes* ovate-acuminate, covered without with numerous glands, .075 in. long, tube short, about half the length of lobes. *Corolla-lobes* oblong-acuminate, .125 in. long, glabrous. *Stamens* closely enfolded; filaments very short; anthers hastate, long apiculate, glandular warted behind, .1 in. long. *Ovary* rounded, pubescent; style about .04 in. long, angular, oblique; stigma minute, notched. *Fruit* a dark red berry, .1 in. in diam., striate and with oblong glands.

PERAK: *Scortechini*; Wray 4102; King's Collector 8078 In open forest at 3,000 to 5,000 feet.

Besides the characteristic leaves, the acuminate petals and hastate long apiculate anthers make this species recognisable, though the leaf-venation resembles that of *L. pumila*

3 *LABISIA LONGISTYLA*, King & Gamble, n. sp. An undershrub about 2 feet high; stem thick, rusty-brown, minutely pubescent. *Leaves* sessile, oblong, entire, rounded at apex and very slightly emarginate, decurrent below in a broad wing for about  $\frac{1}{4}$  of their length; prominently glandular-pitted above and with rusty glandular scales below; 7 to 12 in. long, 3 to 4 in. broad; midrib very thick, prominent, glandular scaly; main-nerves at right angles to midrib, extremely numerous, straight, parallel, anastomosing towards the edge which is slightly recurved. *Inflorescence* a raceme-like rusty-pubescent panicle of single flowers or shortly peduncled few-flowered secund corymbs, 8 to 9 in. long, the main peduncle about 4 in.; corymb-peduncles curved, angled, .3 to .4 in. long; bracts very short, subulate; pedicels striate, about .15 in. long; bracteoles minute. *Calyx-lobes* ovate, acute, glandular without, tube rather shorter than lobes, together .06 in. long. *Corolla* and *stamens* unknown. *Ovary* rounded, pubescent, crowned by a

filiform .2 in. long style. *Fruit* a globose berry, with a conical top and the remains of the style, glabrous, striate with linear-oblong prominent glands.

PERAK: Wray 1590. SELANGOR: Curtis 3750, at 3,000 to 4,000 feet.

### 5. ARDISIA, Swartz.

Small trees, shrubs or semi-herbaceous undershrubs, evergreen, generally all parts with pellucid glands which often dry black. *Leaves* sessile or petiolate, membranous to coriaceous, entire crenate or serrate. *Flowers* regular, pedicellate, hermaphrodite; inflorescence various. *Calyx* inferior, 4-6-lobed, the lobes free or overlapping to the right; tube very open, as long as or shorter than the lobes. *Corolla* red white or spotted, often waxy in appearance, 4-6-lobed, the tube often very short; the lobes overlapping to the right, often twisted. *Stamens* equal in number to, and opposite to, the corolla-lobes, sometimes long and narrow, usually sagittate-lanceolate and apiculate, sometimes very small, fixed to the corolla-tube by filaments usually short and broad, generally opening by slits, occasionally by terminal pores, in *A. littoralis* septate; dehiscence always introrse. *Ovary* globose, sometimes narrowed into the style, more often almost depressed; style usually filiform, rather long; stigma punctiform; ovules few or many, immersed in a globose placenta. *Fruit* a globose, rarely obovoid, berry, usually surmounted by the remains of the style, fleshy, red or purple or black, often spotted; endocarp crustaceous; 1-seeded. *Seed* solitary, large, globose, hollowed at the base; albumen pitted or ruminant; embryo cylindric horizontal — **DISTRIB.** 200 to 250 species, all of tropical or sub-tropical regions in both worlds, scarce in Africa.

*Leaves* entire or crenate, never serrate —

*Leaves* entire, or if crenate without glands in the crenatures. —

*Calyx*-lobes not, or only slightly, overlapping to the right, usually small: —

Inflorescence lateral —

Inflorescence short-peduncled, shorter than the leaves (*A. PIMELANDRA*) —

*Leaves* entire; inflorescence on wood of current and past years: —

*Leaves* over 6 in. long; nerves conspicuous: —

*Leaves* nearly glabrous beneath;  
main-nerves less than 20 .. 1. *A. pachysandra*.

*Leaves* densely tomentose beneath;  
main-nerves more than 20 .. 2. *A. Teysmanniana*.

Leaves under 6 in. long:—

Leaves shining, nerves obscure;  
flower-buds very short, rounded .. 3. *A. chrysophyllifolia*.

Leaves not shining, nerves conspicuous; flower-buds long, acuminate .. 4. *A. solanoides*.

Leaves crenate, inflorescence on wood of current year .. 5. *A. fulva*.

Inflorescence long-peduncled (II. AKOSMOS).—

Peduncles slender, under 1 in. long, pubescent; leaves membranous .. 6. *A. ferruginea*

Peduncles thick, 3 to 3.5 in. long, glabrous; leaves coriaceous.. .. 7. *A. lankawiensis*

Inflorescence terminal:—

Style exsert in the bud (III. STYLARDISIA).—

Leaves membranous; inflorescence short, few-flowered .. 8. *A. andamanica*

Leaves chartaceous or coriaceous, inflorescence elongate, many-flowered.—

Leaves without a conspicuous intramarginal nerve.—

Calyx-lobes .05 in. long or under, usually glabrous —

Leaves coriaceous —

Leaves not thickly scaly beneath.—

Nerves of leaves obscure, leaves dark when dry .. 9. *A. tuberculata*.

Nerves of leaves prominent, leaves pale when dry .. 10. *A. ophurensis*.

Leaves thickly scaly beneath:—

Leaves broad; main-nerves very many, prominent, over 24 pairs .. 11. *A. labisæfolia*.

Leaves narrow; main-nerves fewer, obscure, 20 pairs .. 12. *A. montana*

Leaves chartaceous:—

Panicles slender, elongate, leaves usually small, main-nerves at about 60° to midrib .. 13. *A. sinuata*

Panicles rather thick, compact; leaves generally large, main-nerves at about 75° to midrib .. 14. *A. colorata*.

Calyx-lobes .2 in. long, ferruginous pubescent .. 15. *A. crassa*.

Leaves with a conspicuous intramarginal nerve .. 16. *A. platyclada*.

Style not exsert in the bud (IV. ACRARDISIA).—

Branches of the inflorescence racemose; buds long, slender .. 17. *A. porosa*.

Branches of the inflorescence umbellate; buds short, conical .. 18. *A. divergens*

Calyx-lobes clearly overlapping to the right, usually large and broad.—

Inflorescence terminal (V. TINOPSIS):—

- Leaves under 6 in. long; panicle compact, pedicels slender, flowers rather small; berry globose, .2 in. in diam. .. 19. *A. sumatrana*.
- Leaves usually over 6 in. long; panicle spreading, pedicels stout, flowers large; berry depressed, over .25 in. in diam. .. 20. *A. lanceolata*.
- Inflorescence lateral (VI. *TINUS*):—
- Anthers septate; leaves coriaceous, obovate, inflorescence short .. .. 21. *A. littoralis*.
- Anthers not septate:—
- Leaves usually over 6 in. long.—
- Leaves 8 to 15 in long, elliptic, buds .25 in long .. .. 22. *A. Kunstleri*.
- Leaves 5 to 10 in. long:—
- Main-nerves at about an angle of 60° with midrib:—
- Buds .4 in. long or more; leaves coriaceous.—
- Buds conical; calyx-lobes rounded; raceme glabrous .. 23. *A. solanacea*.
- Buds rounded; calyx-lobes emarginate, raceme rusty-pubescent .. 24. *A. lurida*.
- Buds .8 in. long only, rounded; leaves chartaceous .. .. 25. *A. oxyphylla*.
- Main-nerves at only about 30° with the midrib; calyx-lobes emarginate .. 26. *A. Scortechinii*.
- Leaves usually under 6 or even 5 in. long:—
- Leaves few-nerved; inflorescence long, racemose .. .. 27. *A. pendula*.
- Leaves many-nerved; inflorescence short, 1-5-flowered .. .. 28. *A. Hullettii*.
- Anthers not known; leaves 7 to 10 in. long, under 2.5 in. broad; main-nerves at an angle of 80° with midrib in an elegant network with secondary nerves and reticulations .. 29. *A. oblongifolia*.
- Anthers not known; leaves elliptic or elliptic-ovate, acuminate, 4.5 to 6.5 in. long; calyx-lobes 4; inflorescence apparently terminal .. 30. *A. tetrasepala*.
- Anthers not known; leaves 3 to 5 in. long, under 1.5 in. broad, acuminate, flowers 2 .. 31. *A. biflora*.
- Anthers not known; leaves 4 to 6 in. long, .7 to .9 in. broad, linear-lanceolate; flowers in peduncled axillary umbellate racemes, about 5 to 8 .. .. 32. *A. tahanica*.
- Leaves crenate, with glands in the crenatures (VII. *CRISFARDISIA*):—
- Calyx-lobes more or less gland-dotted:—
- Calyx-lobes oblong, obtuse or obtusely acute:—
- Calyx-lobes lingulate, over .25 in. long, sparsely dotted; inflorescence short; leaves lanceolate, more or less villous. .. 33. *A. villosa*.
- Calyx-lobes under .1 in. long, prominently

- dotted; inflorescence long; leaves oblong, glabrous, pale .. .. 34 *A. virens*
- Calyx-lobes ovate, more or less acute —**
- Inflorescence axillary, racemose or umbellate:—**
- Racemes or umbels in the axils of upper leaves only —**
- Leaves over 5 in long, crenatures broad, very shallow, rounded.—
- Leaves membranous, pedicels slender 35 *A. Wrayi*
- Leaves coriaceous, pedicels thick .. 36 *A. minor*
- Leaves under 4 in. long, crenatures narrow, almost dentate .. 37 *A. perakensis*
- Racemes in the axils of all or nearly all the leaves, crenatures narrow .. 38 *A. Meziana***
- Inflorescence terminal or pseudo-terminal —**
- Inflorescence of a single sessile, umbellate raceme; leaves 4 to 8 in long .. 39 *A. Ridleyi***
- Inflorescence usually of panicle racemes; leaves 2 to 4 in long .. 40 *A. crenata***
- Calyx-lobes not gland dotted, inflorescence terminal or pseudo terminal —**
- Branches of inflorescence short, not more than 1 in long; leaves 2 to 4 in long .. 41 *A. rosea***
- Branches of inflorescence 2 to 3 in long, leaves 4 to 6 in long .. 42 *A. longepedunculata***
- Leaves acutely and prominently serrate occasionally abortive (VIII. BLADRIA) —**
- Inflorescence long, reaching 6 to 8 in, leaves large, nearly or quite sessile .. 43 *A. Maringayi***
- Inflorescence short, under 2.5 in, leaves petioled —**
- Inflorescence 1.5 to 2.5 in long; anthers mucronate, leaves under 3 in long .. 44 *A. theaeifolia*.**
- Inflorescence under 1.5 in long, anthers emarginate, leaves over 4 in long —**
- Leaves and branchlets fulvous villous, flowers pink, ovary and base of style pubescent .. .. 45 *A. odontophylla* var *Lobbi*
- Leaves and branchlets glabrous, flowers white; ovary and base of style glabrous .. 46 *A. bambusetorum*

1 **ARDISIA PACHYSANDRA**, Mez Monog. Myrs. 97 fig. 14 A-E (1901)

A large shrub or small tree reaching to 40 to 50 feet high, and 6 to 10 in. diam.; branches with pale brown bark, marked with decurrent lines below the leaves or leaf-scars, branchlets thickly rusty-villous at the ends. *Leaves* membranous; oblong or slightly obovate, acute at apex, cuneate at base; glabrous above, except on the midrib which is sometimes minutely pubescent, glabrous or slightly pubescent beneath; entire, glands numerous near the margins; 6 to 10 in. long, 1.5 to 3 in broad; midrib thick, slightly impressed above, main-nerves

14 to 20 pairs, irregular, .4 to .5 in. apart, starting at an angle of about 60°, then slightly arching to and along the margin; petiole .4 to .6 in. long, pubescent, wrinkled, slightly channelled above. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels or corymbs; peduncles .1 in. long, flowers 6 to 8; pedicels slender, pubescent, striate, .4 in. long; bracts minute, subulate, densely pubescent, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .2 in. long, slightly overlapping to the right, ciliate, gland-dotted especially near the tip. *Corolla-lobes* boat-shaped, broadly ovate, shortly acuminate, .3 in. long, glabrous, white, faintly nerved, dots very few, revolute in flower; tube short. *Stamens* a little shorter than corolla-lobes; anthers ovate, cuspidate-acuminate, much gland-dotted and warted at the back on the connective; filaments thick. *Ovary* rounded, glabrous, style subulate, as long as the anthers. *Berry* .2 to .4 in. in diam., globose, glabrous, pale. *Myrsine pachysandra*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 297; Wall. Cat. 2284; A. DC. in Trans. Linn. Soc. XVII. 111. *Pimelandra Wallichii*, A. DC. in Ann. Sc. Nat. 2. XVI. 88; Prod. VIII. 106; Deless. Ic. Sel. V. 14. t. 31; Scheff. Myrs. 94; Miq. Fl. Ind. Bat. II. 1029; Clarke in Hook. f. Fl. Br. Ind. III. 531.

PENANG: Wallich 2284; Porter; Curtis 1156, 3164, 3181, 3737. MALACCA: Griffith (K.D.) 3597; Maingay (K.D.) 1006. PERAK: Wray 1358; King's Collector 5995, 7194.—DISTRIB. Borneo (?).

2. *ARDISIA TEYSMANNIANA*, Scheff. in Tijdschr. Ned. Ind. XXXI. 368 and in Flora 253 (1870). A large shrub or small tree; branchlets brown, with wavy longitudinal lines passing downwards from the sides of the bases of the petioles, lenticels numerous, innovations densely ferruginous-pubescent. *Leaves* entire, chartaceous; oblong or slightly obovate-oblong or oblong-lanceolate, acuminate at the apex, alternate and sometimes abruptly rounded at base; glabrous above, densely ferruginous-tomentose beneath; glands very numerous, small, evenly distributed over the whole under surface; 6 to 11 in. long, 1.5 to 3 in. broad; midrib thick, prominent beneath; main-nerves 25 to 30 pairs, .3 to .4 in. apart, starting at an angle of 60°, at first straight, then curving to meet in the margin in a looped nerve, raised beneath as are the few secondary nerves and the many oblique reticulations; petiole very thick, .5 to .6 in. long, usually bordered by the decurrent margins of the blade which are again revolute. *Inflorescence* of axillary pedunculate umbels or corymbs; peduncles in flower .1 to .2 in. long, in fruit sometimes up to .5 in., 4-5-flowered; pedicels slender, .4 in. long, densely rusty-pubescent, striate; bracteoles linear-subulate, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .1 in. long, ciliate. *Corolla-lobes* ovate-acuminate, .2 in. long, softly

pubescent, glands inconspicuous, tube very short. *Stamens* nearly as long as corolla-lobes; anthers ovate, cuspidate-acuminate, concave and warted on the connective at the back, .175 in. long; filaments slender, .05 in. long, glabrous. *Ovary* rounded, glabrous; style slender, subulate, as long as stamens. *Berry* globose, slightly depressed, .3 in. in diam., black-gland-dotted, faintly ribbed. Mez in Monog. Myrs. 97. *Pimelaria* *Teysmanniana*, Hook. f. in Benth. & Hook. f. Gen. Fl. II. 64. *melandra Wallichii* var. *Teysmanniana*, Clarke in Hook. f. Fl. Br. Ind. III. 531.

MALACCA: *Maingay* (K.D.) 1007. SINGAPORE: *Cantley*; *Ridley* 2900, 5573, 6788.—DISTRIB. *Bangka*.

This species is easily distinguished from the former by having many more and much closer nerves to the leaves, and by the dense rusty tomentum.

3. *ARDISIA CHRYSOPHYLLIFOLIA*, King & Gamble, n. sp. A tree, branchlets reddish-brown, innovations densely ferruginous-pubescent. *Leaves* entire, coriaceous; oblong-lanceolate, obtusely acute at apex, narrowed at base; glabrous on both surfaces; glands scattered, visible on the under surface; 4 to 6 in. long, .75 to 1.25 in. broad; midrib thick, prominent; main-nerves many, more or less parallel, inconspicuous, meeting, with the secondary nerves, in a wavy intramarginal nerve, reticulations fine; petiole .4 to .5 in. long, glabrous, channelled above and edged by the decurrent margin of the blade. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels of up to about 12 flowers; pedicels slender, .2 in. long, ferruginous-pubescent; bracts minute, triangular; buds very short, rounded. *Calyx-lobes* 5, ovate, minutely ciliate, pubescent and scaly outside, dotted with many conspicuous golden glands, .05 in. long, tube a little shorter. *Corolla-lobes* ovate, concave, sparsely glandular, glabrous, .08 in. long; tube none or very short. *Stamens* a little shorter than the corolla-lobes; anthers ovate acuminate, black-gland-dotted behind; filaments short. *Ovary* rounded, glabrous, style subulate, .05 in. long. *Berry* globose, somewhat depressed, covered with round and elongate glands, .15 in. in diam.

PERAK. at Lower Camp, Gunong Pateh, 3,400 feet, *Wray* 483, 1118, 1182

4. *ARDISIA SOLANOIDES*, King & Gamble, n. sp. A small shrub, 3 to 4 feet high; branches slender, smooth, dark brown; branchlets glandular-hirsute, marked by obscure raised lines from the sides of the bases of the petioles. *Leaves* entire, membranous; elliptic, bluntly long caudate-acuminate at apex, attenuate at base; glabrous above, more or less glandular-hirsute beneath; glandular dots many, scattered, prominent; 2.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib slender,



raised beneath ; main-nerves 8 to 9 pairs, raised, at an angle of  $60^{\circ}$  with the midrib, the lowest pair more oblique, nearly straight, meeting at about two-thirds of the way to the margin in a looped intramarginal raised nerve, reticulations obscure ; petiole .15 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of sessile, axillary, umbellate, nearly glabrous racemes of about 4 to 6 flowers, racemes hardly .1 in. long ; bracteoles oblong-lanceolate, gland-dotted, .1 in. long ; pedicels slender, .3 to .4 in. long, slightly clavate ; buds conical, acuminate, .3 in. long ; flowers white with a blueish tinge. *Calyx-lobes* 4 to 5, very short, rounded, scarious and ciliate on the margins, gland-dotted. *Corolla-lobes* ovate below, caudate-acuminate above, twisted and reflexed in flower, .3 in. long, sparsely pale-glandular-punctate. *Stamens* nearly as long as corolla-lobes, lanceolate, membranous at tip, with two lines of glandular dots on the back of the connective. *Ovary* rounded ; style very slender, as long as stamens. *Berry* bright red, glossy, .25 in. in diam. when dry.

PERAK in dense jungle on rich soil, at 500 to 800 feet, *King's Collector* 4254.

This species very closely resembles *Antitrophe caudata*, but is at once distinguished by the fact of the corolla-lobes overlapping to the right instead of to the left. The flowers somewhat resemble those of *Ardisia porosa*.

5. *ARDISIA FULVA*, King & Gamble, n. sp. Apparently a shrub ; branchlets rather thick, usually marked by raised lines descending from the bases of the leaves ; innovations densely tawny-villous ; leaf-buds lanceolate, densely pubescent. *Leaves* coriaceous ; elliptic-oblong or elliptic-lanceolate, shortly acuminate at apex, somewhat rounded at base ; glabrous or slightly scaly above, thickly tawny-villous beneath ; glandular dots few, scattered, obscure, in the areoles of the minor nerves ; crenate, especially in the upper two-thirds ; 4 to 7 in. long, 1 to 2 in. broad ; midrib slender ; main-nerves 20 to 24 pairs, irregular, arching upwards and joining in an intramarginal nerve ; secondary nerves slender, faint, reticulations curved, petiole .4 to .6 in. long, winged by the decurrent edges of the blade. *Inflorescence* of short 1 to 1.5 in. long, densely tawny-pubescent, drooping, corymbs in the axils of tawny, leaf-like, often nearly 1 in. long, bracts from the young branches below the end leaves ; peduncles about .7 in. long, slender, pedicels slender, up to .5 in. long ; bracteoles subulate, short, tawny ; buds ovate, .2 to .25 in. long. *Calyx-lobes* ovate, thin, villous without, ciliate, .1 to .15 in. long, marked with prominent black dots, recurved in flower ; tube short. *Corolla-lobes* obovate, obtuse, .2 to .25 in. long, oblique, unequal, marked by prominent round or oblong black dots, tube short. *Stamens*

a little shorter than the corolla-lobes, acuminate, with 2 rows of prominent black dots behind the anthers; filaments short. *Ovary* ovoid, surmounted by a short, .1 in. long, subulate style, glabrous. *Berry* .2 in. in diam., black when dry, ribbed.

KEDAH : on Langkawi Island, *Curtis* 2133. PENANG : *Ridley* 10216. PERAK : *Ridley* 8269.

6. *ARDISIA FERRUGINEA*, Mez Monog. Myrs 108 (1901). A shrub (?); branchlets slender, densely ferruginous-tomentose. *Leaves* membranous; linear- or oblong-lanceolate, bluntly acute at apex, rounded at base; glabrous or slightly rusty-scaly above, rusty-pubescent beneath; entire; glands not apparent; 3 to 4.5 in. long, .75 to 1 in. broad; midrib slender, nerves very faint; petiole .1 to 2 in. long, rusty-pubescent. *Stipules* small, linear-falcate. *Flowers* in densely ferruginous-pubescent, bipinnate panicles in the axils of upper leaves; peduncles .5 to .75 in. long; bracts linear subulate about .15 in.; pedicels slender, .1 to .2 in. long; bracteoles minute; buds conical. *Calyx-lobes* ovate, obtuse, ciliate, connate to rather over one-third, with wavy glandular dots. *Corolla-lobes* shortly connate at the base, broadly and obliquely ovate, short acuminate, gland-dotted. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate, gradually acute, scarcely punctate; filaments very short. *Ovary* ovoid, glabrous, style slender

JOHORE : at Kampong Sunpai, *Lake & Kelsall* (*Ridley* 4032).

This species does not seem to differ very much from *A. Miqueliana*, Scheff. in Tijdsch Ned Ind XXXI. 367, in respect to leaves, but that species has terminal and not axillary flowers.

7. *ARDISIA LANKAWIENSIS*, King & Gamble, n. sp. A tree, branchlets smooth, glabrous, obscurely striate, with raised lines from the edges of the bases of the leaf-petioles. *Leaves* coriaceous, elliptic or elliptic-lanceolate, acuminate at apex, acute at base, glabrous; entire, glandular dots frequent near the margins; 3.5 to 5 in. long, 1.25 to 1.5 in. broad; midrib slender; main-nerves obscure, about 12 to 14 pairs, anastomosing near the margin, secondary nerves and reticulations similar; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade. *Flowers* pink, in long-peduncled, closely congested racemes in the axils of the uppermost leaves, peduncles 3 to 3.5 in. long, flattened, glabrous; pedicels .5 to .7 in. long, striate, slender; bracteoles minute, caducous. *Calyx-lobes* ovate, acute, ciliate, with many glands on the back, .075 in. long. *Corolla-lobes* ovate, acuminate, much gland-dotted, .25 to .3 in. long. *Stamens* a little shorter than the corolla-lobes, ovate-lanceolate, mucronate, dehiscing on the margins but more widely near the top. *Ovary* rounded, obscurely 5-lobed; style .2 in. long, twisted and

wrinkled. *Fruit* a depressed, obscurely 5-angled berry, .2 in. in diam., pericarp very smooth inside

KEDAH on Lankawi Island, *Ridley* 8313

8 *ARDISIA ANDAMANICA*, Kurz For Fl II, 108 (1877) and in Journ. As. Soc Beng XLVI ii 225 A small or medium sized evergreen shrub reaching 15 feet high and 2 in in diam, branches slender with reddish-brown bark, striate when dry, branchlets glabrous. *Leaves* entire, membranous, oblong lanceolate, narrowly long acuminate at apex, cuneate at base, glabrous on both surfaces but with many scattered glandular dots and occasional peltate scales, 3 to 6 in long, .75 to 1.75 in broad, midrib slender, main-nerves about 20 pairs, very thin and inconspicuous, at about 60° with the midrib, at first straight then arching upwards to and along the margin, petiole 3 to 5 in. long, channelled above. *Inflorescence* a loose terminal panicle 2 to 3 in long, with few slender umbel like racemes on 3 to 5 in long, squarrose peduncles, pedicels slender, 3 in, bracteoles small, ovate, deciduous. *Calyx-lobes* acute, triangular, .05 in long, minutely ciliate at the edges dotted with black glands, tube rather shorter than lobes. *Corolla-lobes* ovate, acute, .15 in long, glabrous, with inconspicuous nerves and few scattered round or oblong glands. *Stamens* a little shorter than corolla-lobes, anthers ovate, apiculate, 1 in long, glabrous on the back or with few black glands, filaments .05 in. *Ovary* rounded, glabrous, style filiform, long exsert, .15 in long. *Berry* round or slightly pyriform, smooth, .3 in in diam. Clarke in Hook f Fl Br Ind III 521, Mez Monog Myrs 110 *Ardisia nerufolia*, A DC Prod VIII 127 in part (not of Wall), Trans Linn Soc. XVII t 8 (*fig only*)

MALACCA *Griffith* (K.D.) 3570, *Hullett* 830, *Stoliczka* PERAK *Ridley* 9718, *Wray* 867, 943, 971, 1033, *King's Collector* 5692, 8064 JOHORE *Ridley* 3717 —DISTRIB Andamans, Mergui.

9 *ARDISIA TUBERCULATA*, Wall Cat 2274 (1829). A shrub, reaching 10 feet in height, branchlets smooth, stout, reddish, uppermost flattened, glabrous. *Leaves* entire, coriaceous, elliptic, bluntly acuminate at apex, attenuate or rounded at the base, glabrous and shining above, covered beneath with rather deciduous peltate scales, dark when dry; 3 to 6 in long, 1 to 2 in broad, midrib prominent, main-nerves obscure, about 15 pairs, starting at an angle of about 75° from the midrib, then arched upwards to and along the margin, secondary nerves more slender, reticulations obscure, petiole 3 to 5 in long, thick, rough, winged by the decurrent margins of the blade. *Inflorescence* a lax, leafy, terminal, tripinnate, 3 to 6 in long, panicle, rachis flexuous, flattened, often scaly, primary peduncles squarrose, 6 to 1 in long, supported by ovate acuminate leafy bracts, secondary peduncles also squarrose,

3 to 5 in. long with subulate bracts, ultimate racemes umbellate, 6-8-flowered, pedicels slender, short, 1 to 15 in long, bracteoles subulate, buds ovoid, obtuse, glabrous. *Calyx lobes* ovate, acute or rounded, 05 in long, margin ciliate, dotted with black glands. *Corolla lobes* broadly ovate, blunt, glabrous, 1 in long, with very few dots, tube very short. *Stamens* a little shorter than the corolla lobes, anthers acute, but gland dotted behind, filaments minute, broad. *Ovary* globose, style subulate, longer than the petals. *Berry* obovoid, smooth, 15 to 2 in in diam. A DC in Trans Linn Soc XVII 119, Prod VIII 130, Miq Fl Ind Bat II 1026, Clarke in Hook f Fl Br Ind III 521, *except var*, Mez Monog Myrs 112, fig 16. *A chrysophyllordes*, Miq Fl Ind Bat Suppl 574.

PENANG Wallach 2274 MALACCA Derry 394 PAHANG Ridley 1071 JOHORL Ridley 6438 SINGAPORE Griffith (K D) 3564 MANGAY (K D) 1014, Ridley 2817, 8916, 1916(A) —DISTRIB Bangka Teysmann

10 *ARDISIA OPHIRLENSIS*, Mez Monog Myrs 113 (1901) A shrub (?), branchlets pale brown, flattened, smooth, innovations minutely ferruginous-scaly. *Leaves* coriaceous, elliptic, shortly acuminate at apex, rounded or somewhat acute at base, pale and somewhat shining on both surfaces, the under covered with minute brown peltate scales, glands scattered, numerous. 3 to 6 in long, 1 75 to 2 25 in broad, midrib thick, prominent, main nerves prominent, raised on both surfaces, 10 to 12 pairs, starting at an angle of about 75° with the midrib, at first straight then curving upwards to meet some way from the margin in a prominent network, secondary nerves prominent, reticulations transverse, petiole 4 to 5 in long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a terminal, leafy, angular, tripinnate panicle, about 3 to 4 in long, rachis flexuous, flattened, scaly, peduncles squarrose, about 1 in long, supported by ovate oblong, reflexed, leafy bracts, pedicels 3 in long, slender, in fruit very spreading. *Calyx lobes* ovate, acute, 05 in long, back dotted with prominent large glands. *Corolla lobes* elliptic-ovate, rather oblique, shortly connate, nervose, glands few, near the apex, black. *Stamens* rather shorter than the corolla lobes, anthers ovate, large, not glandular, apiculate filaments short, slender. *Ovary* ovoid, glabrous, style long, subulate, exsert. *Berry* black when dry, 15 in in diam, with prominent glands. *A tuberculata* var *ophurensis*, Clarke in Hook f Fl Br Ind III 522.

MALACCA Hullett 754, Ridley 621, Miller 9 On the top of Mount Ophu

11 *ARDISIA LABISIAEFOLIA*, King & Gamble, n sp. A small tree, branchlets thick, slightly flattened, smooth, glabrous below, lepidote-

scaly above *Leaves* coriaceous, elliptic or elliptic oblong, shortly and rather abruptly acuminate at apex, rounded at base, glabrous above when old, when young densely covered, as is the under-surface always, with rather large reddish-brown peltate scales, margins recurved, 6 to 8 in long, 2 to 4 in broad, midrib thick, prominent, impressed above, main-nerves 24 to 30 pairs, irregularly spaced, at first parallel, leaving the midrib nearly at right angles, then near the margin curving upwards to and along the margin and anastomosing with the prominent secondary nerves which resemble the main ones, reticulations prominent in an elegant network, all more or less raised above when dry, petiole 5 to 8 in long, thick, bordered above by the decurrent margins of the blade *Inflorescence* a pyramidal, rusty scaly, bracteate, tripinnate panicle, up to 6 in long, the branches bearing sub-umbellate, pedunculate clusters of small flowers, rachis somewhat flattened, rusty scaly, bracts leafy spatulate, bracteoles minute, ovate, pedicels 1 to 2 in long, reflexed *Calyx lobes* ovate, 0.6 in long, ciliate, scaly and glandular dotted, tube one third of lobes *Corolla lobes* deep pink, ovate-acute, 1.4 in long, with a very few black glands *Stamens* nearly as long as corolla lobes, anthers ovate, acute, 1 in long, apiculate, filaments rather thick, 3 to 4 in long, minutely pubescent *Ovary* rounded, glabrous, style slender, exsert *Berry* globose, often depressed at top, 1.5 to 2 in in diam, black when dry

PERAK Wray 320, 1566, *Scorteum* Hilltops at 6,500 to 7,000 feet

12 *ARDISIA MONTANA*, King & Gamble, n sp A shrub reaching 4 to 6 feet in height, branchlets brown, somewhat angular, uppermost covered with a nearly furfuraceous glandular tomentum *Leaves* coriaceous, elliptic oblong or oblong lanceolate, obtusely acuminate at apex, rounded or attenuate at base, scaly above, densely ferruginous hairy and scaly beneath, scales stellate, glandular dots scattered, obscure, margins slightly recurved, 4 to 6 in long, 1 to 2 in broad, midrib prominent, impressed above, main nerves 20 pairs, obscure, irregular, starting nearly at right angles to the midrib and curving upwards to and along the margin, secondary nerves many, reticulations obscure petiole 5 in long, channelled above by the decurrent margins of the blade densely scaly and ferruginous-pubescent *Inflorescence* a rather lax, terminal, pyramidal, bi-tri pinnate, leafy panicle, up to 6 in long in fruit, shorter in flower, the branches bearing sub umbellate pedunculate clusters of minute flowers, rachis somewhat flattened, furfuraceous scaly, branches squarrose, peduncles 5 to 7 in long, umbel peduncles 5 in long, pedicels 2 in long, often reflexed, bracts leafy, deciduous, bracteoles ovate, very small *Calyx-lobes* ovate-acute, under 0.5 in long, margins scarious ciliate, dotted with large glands

*Corolla-lobes* slightly longer than calyx lobes, ovate, glabrous, gland-dotted. *Stamens* as long as corolla-lobes, anthers ovate, apiculate, filaments extremely short. *Ovary* rounded, glabrous, style subulate, rather thick, scarcely exsert. *Berry* red, globose, 15 in in diam., gland dotted when dry.

PERAK Wray 327, 3869, *Scortechini* 296, *King's Collector* 8029  
Rocks and hilltops at 3,000 to 7,000 feet

13 *ARDISIA SINUATA*, King & Gamble, n sp. A shrub or small tree, reaching a height of 10 to 15 feet and a diam of stem of 2 to 3 in, branchlets pale brown, sinuate, compressed, with raised lines joining the sides of the bases of the petioles, minutely scaly-pubescent or nearly glabrous. *Leaves* chartaceous, elliptic oblong, acute or shortly acuminate at apex, rounded or attenuate at base, glabrous above, minutely scaly beneath when young, afterwards glabrate, glandular dots few, scattered, 3 to 6 in. long, 1 to 2 in broad, midrib slender, main nerves 10 to 12 pairs, 3 to 4 in apart, starting from the midrib at an angle of 60° and at once curving upwards to and along the margin, secondary nerves and reticulations faint, petiole 3 to 4 in long, channelled above by the decurrent margins of the blade. *Inflorescence* a lax, terminal, bracteate, nearly glabrous, bi-tri pinnate panicle 5 to 7 in long, the branches bearing subumbellate clusters of small flowers. *rachis* flat, sinuate, bracts leafy, uppermost lanceolate recurved, 5 to 1 in long, bracteoles minute, ovate, pedicels slender, 1 in long. *Calyx lobes* triangular-ovate, glabrous, ciliate, gland dotted, 0.4 in long. *Corolla lobes* pale green or pink, ovate, acute, margins transparent. *Stamens* nearly as long as corolla lobes, anthers broadly ovate, shortly apiculate, filaments very short. *Ovary* rounded, glabrous, style slender, exsert, 1 to 1.5 in long. *Berry* globose, 15 in in diam, obscurely striate and black when dry.

PERAK Wray 2408, 3023, *King's Collector* 4599

14 *ARDISIA COLORATA*, Roxb Hort Beng 16 (1814), Fl Ind I 581, and Fl Ind Ed Carey and Wall II 271. A large shrub or small tree, reaching 25 feet in height and a girth of 1 foot, branchlets compressed, pale brown, more or less lepidote-scaly, furnished with somewhat zigzag raised lines proceeding downwards from the sides of the bases of the petioles. *Leaves* chartaceous, oblong-lanceolate or elliptic-lanceolate, acute or shortly acuminate at apex, cuneate at base, glabrous on both surfaces, entire, glandular dots many, irregularly scattered, chiefly visible on the upper surface, 5 to 10 in long, 1.5 to 3 in broad, midrib prominent beneath, impressed above, main-nerves 20 to 30, also prominently raised beneath and impressed above, usually 3 to 4 in apart, starting at an angle of 70° to 75° with the midrib, at first straight

then arched upwards to and along the margin, secondary nerves many, slender, 1 to 2 between each pair of main nerves, reticulations oblique, petiole rather thick, 5 to 8 in long, channelled above, winged by the decurrent margins of the blade Inflorescence a pyramidal terminal panicle, 4 to 12 in long, tripinnate, ferruginous scaly, bearing clustered umbellate racemes of flowers, rachis much flattened, as are its branch peduncles, primary branches 2 to 6 in long, peduncle 5 in, bracts caducous, secondary branches 5 to 1 in long, peduncles 2 to 4 in, bracteoles small, ovate-acuminate, pedicels slender 1 to 2 in long, umbels many flowered Calyx lobes ovate, bluntly acute, 0.5 to 0.8 in long, densely gland dotted, margins scarious and ciliate, tube rather shorter than lobes Corolla lobes pink, ovate acute, oblique, unequal, about 1.5 in long, not gland dotted, tube very short Stamens a little shorter than corolla lobes, anthers sagittate, acuminate, filaments very short Ovary ovoid, glabrous, style thick, 2 in long Berry globose, 2 to 2.5 in in diam, deep red to black, obscurely ribbed when dry, shining Clarke in Hook f Fl Br Ind III 520, Mez Monog Myrs 113 *A pyramidalis*, Roth Nov Pl Sp 123 (not of Cav) *A Rothii*, A DC. in Trans Linn Soc XVII 117, Prod. VIII 126 *A anceps*, Wall in Roxb Fl. Ind 1 c 280, and Cat 2261, DC Prod 1 c Kurz in Journ As Soc Beng XLVI II 224, and For Fl II 107, Scheff Myrs 77 *A polycarpa*, Wall Cat 2285 *A grandiflora*, Wall Cat 2272

KEDAH Ridley 5509 PERAK *Scortechini* 20, 203, 397, 1505 1568, King's Collector 798, 1301, 3099, 3284, 3567, 6473, 6823, 7741 8252, 10866 Ridley 5508 PROVINCE WELLESLEY Ridley 694, SELANGOR Ridley 7559, Goodenough 10551 MALACCA *Mamyau* (K D) 1008, Goodenough 1762, Derry 553, 915, 1075, Ridley 1245 1581, 2817 —DISTRIB India, Burma, Malay Islands

VAR *polyneura*, Clarke in Hook f Fl Br Ind III 520 Leaves paler when dry than in the typical form, wide, reaching 4.5 in in width, sometimes reaching 1.5 in in length, more usually elliptic oblong or obovate, more rounded at base, all nerves more prominent Panicle wide at the base, pedicels much reflexed, rachis very much flattened *A polyneura*, Miq in Pl Jungh I 198, and Fl Ind Bat II 1022, Scheff Myrs 81

PERAK Ridley 3000, *Scortechini* 1290, 1412, Wray 1643, 1950, 2810, King's Collector 527, 2152, 2197, 2629, 3643, 3655, 3657, 4119, 4751, 6922, 8640 MALACCA Griffith (K D) 3568 —DISTRIB Java

VAR *complanata*, Clarke 1 c Panicles smaller, rusty pubescent, flowers and berries smaller, panicle, rachis, and branches much flattened Leaves usually narrower and smaller, rarely over 7 in. long

and 2.75 in. broad. *A. complanata*, Wall. Cat 2277, Wall in Roxb Fl. Ind. ed. Carey & Wall II. 210, DC. Prod VIII 126, Scheff. Myrs 78, Miq Fl. Ind. Bat II. 1024. *A. sanguinolenta*, Bl. Bijdr 685 (not of Wall.). *A. Zollingeri*, DC Prod VIII. 670.

PENANG Wallach 2277, Curtis 1052, 22494 PERAK Wray 2896, 3929, *Scortechini* 144, 112, King's Collector 7680 — DISTRIB. Chittagong, Java, Sumatra.

VAR. *salicifolia*, King & Gamble. Leaves lanceolate, 5 to 7 in long, 1 to 1.5 in. broad, glabrous, obscurely gland dotted, main nerves not prominent Panicle spreading, leafy, rachis zigzag, much flattened, bracteoles persistent.

PERAK Wray 2960, King's Collector 3216, 6816, 8563. MALACCA Hervey.

VAR. *elliptica*, King & Gamble. Leaves elliptic or elliptic-obovate, acuminate at apex, cuneate at base, glabrous, 4.5 to 8 in. long, 2 to 3 in broad, main nerves fewer, 15 to 20 pairs, less prominent Panicle rather short and stout, 4 to 6 in. long, pyramidal rachis less flattened, scarcely zigzag

PERAK Wray 3293, King's Collector 3326, 3453, 5057, 6473, 6624, 6820, 8856.

15 *ARDISIA CRASSA*, Clarke in Hook. f. Fl. Br. Ind. III 518 (1882) A small tree, branches pale brown, rounded, stout, branchlets somewhat flattened above and with raised lines from below the base of the petioles. Leaves coriaceous, oblong, acute or slightly blunt acuminate above, cuneate at base, glabrous and shining above, rufoescent and with inconspicuous rounded scales beneath, entire, 4 to 9 in long, 1.5 to 2.5 in broad, midrib prominent beneath, main-nerves nearly regular at first, nearly at right angles to midrib, afterwards arching upwards and round parallel to the edge, 20 to 27 pairs, secondary obscure. Inflorescence a terminal rusty-pubescent panicle, 5 to 6 in. long, with remote branches ending in closely packed umbels, rachis thick, much flattened, flexuose, branches first at right angles, then curved, 5 to 8 in. long, pedicels very short, thick, bracteoles ovate, blunt, about .1 in. long Calyx-lobes thick, ovate-orbicular, .2 in long, minutely ferruginous pubescent, overlapping to right, tube about half the length of the lobes Corolla lobes broadly ovate, unequal, obliquely and shortly acute, 15 in long. Stamens shorter than corolla-lobes, anthers ovate, acute, filaments very short, broad at base. Ovary rounded, glabrous, style short, about 1 in. long, subulate. Berry globose, depressed, not striate, .25 in. in diam. Mez Monog. Myrs. 114.

MALACCA Mangay (K.D.) 1015, Goodenough 1808. — DISTRIB. Borneo.



16. *ARDISIA PLATYCLADA*, King & Gamble, n. sp. A small tree or shrub reaching 10 to 15 feet in height, branchlets pale brown, prominently marked by zigzag raised lines joining the sides of the bases of the petioles, uppermost ones prominently flattened and covered with rusty furfuraceous scales, as are also the young leaves. *Leaves* chartaceous, oblong or elliptic-oblong, abruptly acuminate at apex, attenuate and somewhat rounded at base, both surfaces covered when young with rusty stellate scales, glabrescent when old, margins undulate, recurved, 4 to 6 in long, 1.5 to 2 in broad, midrib slender but prominent beneath, impressed above, main nerves 14 to 18 pairs, 3 to 4 in apart, rather irregularly parallel, leaving the midrib at an angle of about 65° and joining at 1 to 2 in from the margin in a very prominent intra-marginal looped nerve. Secondary nerves and reticulations obscure, petiole none or very short, rarely 2 in long, rugose, rusty scaly, and bordered by the decurrent margins of the blade. *Inflorescence* a terminal, compact, bracteate, rusty scaly, pyramidal, bi-tri-pinnate panicle, 4 to 5 in long, the flowers in dense subumbellate clusters on the branches, rachis flattened, flexuose, bracts foliaceous spatulate or oblong lanceolate, 5 to 15 in long, bracteoles small, triangular subulate, pedicels glabrous, cernuous, about 1 in long. buds very small, conical. *Calyx lobes* pink, lanceolate, 0.4 in long, ciliate, obscurely red gland dotted, tube as long as or rather shorter than the lobes. *Corolla lobes* waxy white, ovate acuminate, 0.7 in long, slightly gland dotted, tube very short. *Stamens* shorter than corolla lobes, anthers ovate apiculate filaments very short. *Ovary* rounded, minutely pubescent at top, style straight, 15 in long, exsert. *Berry* globose, 15 to 20 in diam, glandular rugose, dark blue, black when dry.

PERAK *Scortechini* 232, *King's Collector* 824, 4569, 5863, 8136, 10140 usually in dense mixed forest

*A. pterocaulis* Miq., Mez Monog. Myrs 111 a tree of the forests of the Sumatran mountains much resembles this at first sight but the leaves are bigger, the flower panicles much larger and more open with shorter pedicels, and the nerves of the leaves do not meet in a prominent looped intramarginal nerve. (*Forbes* 1992 in *Herb. Calc.*)

17 *ARDISIA POROSA*, Clarke in Hook. f. Fl. Br. Ind. III 522 (1882) A shrub, reaching 8 feet in height, branches flexuose, almost zigzag, winged by lines decurrent from the bases of the leaf petioles. *Leaves* chartaceous, oblong, acute at apex, cuneate at base or sometimes rounded acute, glabrous, pale beneath, entire, margin often recurved, glands small and obscure, 5 to 9 in long, 1.5 to 2.5 in broad, midrib rather slender, prominent beneath, main nerves obscure, irregular, about

20 to 25 pairs, secondary faint, all arching upwards into an irregular intramarginal ring and reticulate, petiole 4 in long, narrowly winged by the decurrent blade. *Inflorescence* a loose terminal few-flowered panicle up to 6 in long, rachis flexuous, branches racemose, at right angles to rachis, peduncles 1 to 1.5 in long curving upwards, pedicels .5 to .7 in long, slender, curved upwards, bracteoles minute, ovate, deciduous, flowers 3-5, usually 4 merous, buds slender. *Calyx lobes* ovate, .04 in long, obscurely dotted, tube short. *Corolla lobes* ovate-lanceolate, pink, 3 in long by 1 in broad, recurved in flower, not dotted but striate. *Stamens* as long as corolla lobes, anthers very slender, opening by terminal pores as well as longitudinally, filaments very short, thick. *Ovary* conical, gradually passing into a slender style 2.5 in long. *Berry* globose, .25 in in diam, ribbed, glossy black when ripe. Koord & Val Bijdr V 260, Mez Monog Myrs 118.

PERAK *Scortechium* 116, 1511 King's Collector 3108 MALACCA Griffith (K D) 3578, Mangay (K D) 1012, Wray 39, Goodenough 1528, Hervey

18 *ARDISIA DIVERGENS* Roxb Hort Beng 85 (1814) Fl Ind I 583, and Fl Ind ed Carey & Wall II 275. A small tree, reaching 20 feet in height, branchlets slender, smooth, rounded. *Leaves* chutaceous elliptic or lanceolate, shortly acuminate at apex, rounded at base, drying reddish brown, glabrous on both surfaces entire, margins slightly incurved, glandular dots large, prominent especially near the margin, 3 to 5 in long, 1 to 2 in broad midrib prominent beneath primary nerves 8 to 12 pairs, irregular, arched and joining in an intra-marginal prominent nerve with a smaller, less prominent nerve near the edge, secondary nerves few, slender, reticulate, petiole 1.5 to 3 in long, winged by the decurrent blade. *Inflorescence* a loose terminal rusty-pubescent panicle, 2 to 3 in long, ultimate branches umbelled, 3-5 flowered, main peduncle .5 to 1 in long, secondary peduncles about .5 in with lanceolate leafy recurved bracts, pedicels about .4 in long, thickened above, glandular, bracteoles ovate, deciduous, flowers red, buds short, conical. *Calyx lobes* rounded, .05 in in diam, ciliate, conspicuously dotted with few large, transparent, light brown glands, tube short. *Corolla lobes* ovate, acute, 1.5 to 2 in long, unequal in size, and oblique, tube very short, dots very few. *Stamens* a little shorter than the corolla-lobes, anthers large, ovate acute, filaments very short. *Ovary* ovoid, glabrous, attenuated into a .1 in long style. *Berry* round, smooth, somewhat depressed, tipped by the persistent style. Wall Cat 2269, A DC Prod VIII 130, Clarke in Hook f Fl Br Ind. III 521, Mez Monog Myrs 117. *A punctata*, Jack,

ROXB Fl Ind. ed Carey & Wall II 275 (not of Lndl) *A punctulosa*,  
D Dietr Syn Pl I 615, Miq Fl Ind Bat II 1025

PENANG *Jack*, *Wallich* 2269, *Mangay* (K D) 1020, *Curtis* 1769

19 *ARDISIA SUMATRANA*, Miq Pl Jungh I 195 (1853), Fl Ind  
Bat II 1018, and Suppl 247 A large shrub or small tree, reaching 15 to  
20 feet in height and 3 to 4 in in diam of stem, branches pale brown,  
smooth, branchlets minutely ferruginous-scaly. *Leaves* chartaceous  
elliptic-oblong or -obovate, rather suddenly acute at apex, acute or cuneate  
at base, entire, glabrous, glands large, frequent near the margin, 3 to 6  
in long, 15 to 25 in broad, midrib slender, prominent beneath, im-  
pressed above, main nerves 12 to 15 pairs, irregularly spaced, starting  
at an angle of about 50° with the midrib, curving upwards to and along  
the margin, secondary nerves and innovations indistinct, petiole 3 to  
5 in long, bordered above by the decurrent, often erose, margins of  
the blade. *Inflorescence* a compact, shortly pyramidal, 3 to 4 in long,  
squarrosely bipinnate panicle, common peduncle none or scarcely 5 in  
long, bracts minute, triangular, branch peduncles 7 to 1 in long,  
minutely ferruginous scaly as is the rachis, pedicels 2 to 3 in long,  
slender, buds ovoid, conical, flowers waxy-white, pedicels and rachis  
pink. *Calyx lobes* orbicular, 1 in broad, ciliate with scarious margins,  
much overlapping, glandular dots very few, scattered. *Corolla-lobes*  
shortly connate, ovate, acute, much twisted, 15 in long, margins thin,  
denticulate, glands few, large and brown. *Stamens* about two thirds  
the length of the corolla-lobes, anthers ovate-acute, 1 in long, a few  
large black glands on the back. *Ovary* ovoid, glabrous, style subulate  
15 in long. *Berry* bright red at first afterwards black, globose, shining  
2 in in diam, smooth, faintly striate. *Scheff* Myrs 84, *Koord &*  
*Val Bijdr* V 268, *Mez Monog Myrs* 121

PERAK *King's Collector* 771, 5639, 10836 — *DISTRIB* Sumatra,  
*Beccari* 325, 724, *Forbes* 2083 &c, Java

20 *ARDISIA LANCEOLATA*, Roxb Hort Beng 85 (1814), Fl Ind I 563,  
and Fl Ind ed Carey & Wall II 275 A large glabrous shrub or small  
tree, reaching 15 to 25 feet in height branches cylindric, pale, smooth,  
branchlets sometimes fugaciously ferruginous-scaly. *Leaves* coriaceous,  
elliptic oblong or -obovate, shortly acuminate at apex, long cuneate  
at base, entire or sometimes slightly crenate near the apex, glabrous  
on both surfaces, glandular dots large scattered, more numerous near  
the margins, 6 to 11 in long, 2 to 3.5 in broad, midrib prominent  
beneath, impressed above, main nerves 12 to 15 pairs, oblique, starting at  
an angle of about 50° with the midrib, and at first more or less parallel,  
then arching upwards to join in an irregular intramarginal nerve,  
secondary nerves similar but shorter, reticulations scarcely prominent,

irregular, petiole 5 to 7 in long, winged by the decurrent blade, the wings overlapping. *Inflorescence* a spreading, terminal or sometimes sub-axillary, panicle, 4 to 6 in long, rachis flexuose, angular or flattened, branches stout, flattened, swollen at base, bearing corymbose racemes of about 7-8 flowers, pedicels 6 to 1 in long, stout, narrowly clavate, striate, minutely ferruginous pubescent, bracteoles small, obtuse deciduous. *Calyx lobes* orbicular, 2 in in diam, enlarged and spreading in fruit, glabrous or slightly pubescent margins scarious and fimbriate ciliate, base thickened, glandular dots many prominent tube short. *Corolla* ovate acuminate, pink, much twisted in bud, 35 in long, of which one third tube, lobes unequal in size oblique dots not prominent. *Stamens* large, shorter than corolla lobes, anthers ovate acute, dehiscing longitudinally, back with few large usually oblong prominent black glands. *Ovary* globose, style 1 to 2 in long, subulate, twisted. *Berry* globose, depressed, smooth, 25 to 3 in in diam, black when dry. Wall Cat 2292, A DC Prod VIII 126 Miq Fl Ind Bat II 1025, Clarke in Hook f Fl Br Ind III 519 Mez Monog Myrs 122. *A speciosa*, Bl Bijdr 684, A DC lc 133 Miq in Pl Jungh I 197 and Fl Ind Bat II 1022, Scheff Myrs 88 Mez Monog Myrs 123. *A purpurea*, Reinw, Bl Bijdr 684, A DC lc 129, Miq in Pl Jungh I 197 and Fl Ind Bat 1026, Scheff Myrs 88, Koord & Val Bijdr V 265. *A Hasseltii*, Blume, Scheff Myrs 86, Mez Monog Myrs 123. *A mucronata*, Bl Bijdr 685 A DC lc 126, Scheff Myrs 83, Koord & Val Bijdr V 269, Mez Monog Myrs 123. *A Leschenaultii*, DC lc 133, Miq Pl Jungh I 197 and Fl Ind Bat II 1022, Scheff Myrs 89. *A plagionura* Scheff Myrs 85 Koord & Val Bijdr V 268

PINANG Roxburgh, Cuitis 2755 PERAK Scortechium 1824 Wray 192, 1401, 2480, 2863, 3659, King's Collector 2954, 3200, 4528 4785, 6586 6785, 8730, 10049 MALACCA Griffith (K D) 3569, 3579 Derry 512, 1117 JOHORE Lake & Kelsall 4033 SINGAPORE Major McNair, Cantley 133, Ridley 6136, 6436 —DISTRIB Java Sumatra, Borneo, Celebes

21 ARDISIA LITTORALIS, Andr Repos X t 630 (1811) A glabrous shrub of succulent character reaching 8 to 10 feet in height, branches thick, rounded, buds lanceolate. *Leaves* succulent coriaceous, obovate or oblong obovate, rounded or bluntly acute or almost lanceolate at apex, cuneate at base, entire, glandular dots many, scattered, inconspicuous, 2 to 5 in long, 1 to 2.5 in broad, midrib prominent, main nerves invisible in the fresh plant, obscure when dry, irregular, 13 to 18 pairs, at an angle of about 60° with the midrib, curved upwards to and along the margin, secondary nerves similar, slender, reticulations

obscure; petiole .3 in. long, thick, winged by the decurrent margins of the blade, which are often erose or wrinkled. Inflorescence of axillary umbellate racemes of about 8 flowers each, racemes shorter than the leaves, about 2 in. long; common peduncle about 1 in. long, usually recurved; pedicels .3 in. long, enlarged in fruit to .5 in. and then clavate thickened; bracteoles oblong, obtuse, deciduous; flowers rose-coloured, buds conical .4 in. long. *Calyx-lobes* orbicular, .1 in. in diam., ciliate, edges somewhat scarious, elsewhere thickly dotted with black glands, tube rather longer than lobes. *Corolla-lobes* ovate acuminate, oblique, unequal, lineolate and much gland-dotted, .3 in. long; tube short. *Stamens* nearly as long as corolla-lobes; anthers ovate, acute, united in a cone, opening longitudinally and obscurely septate in the cells; filaments short, on broad bases confluent into a ring adherent to the corolla-lobes. *Ovary* sub-globose, ending in a subulate style .3 in. long. *Berry* globose, depressed, .2 in. in diam., smooth, bright red, turning purplish-black when ripe; black glands many, small. Kurz For. Fl. II 110 and Journ. As. Soc. Beng. XLVI. II. 226. *A. obovata*, Bl. Bijdr. 688; DC. Prod. VIII. 132. *A. humilis*, Clarke in Hook. f. Fl. Br. Ind. III. 529 (not of Vahl. and in part only); Mez Monog. Myrs. 127, fig. 20, A-E. *A. umbellata*, Roxb. Hort. Beng. 16, Fl. Ind. I. 582; Fl. Ind. ed. Carey & Wall. II. 273; Lodd. Bot. Cat. t. 531. *A. solanacea*, Wall. Cat. 2283A (part), 2283D (not of Roxb.). *A. polycephala*, Wight Ill. Ind. Bot. t. 145 (not of Wall.). *Climacandra obovata*, Miq. Pl. Jungh. I 199, Fl. Ind. Bat. II 1030, Schoff. Myrs. 05; Koord & Val. Bijdr. V. 271. *C. littoralis*, Kurz in Journ. As. Soc. Beng. XL. II. 68.

PENANG: *Curtis* 217, *Phillips*. PERAK: *Wray* 1866, 2373; *Scortechini* 1053; *King's Collector* 4960. MALACCA: *Griffith*; *Maingay* (K.D.) 1010; *Hervey*. KELANTAN. *Ridley*. PAHANG: *Ridley* 1638. SINGAPORE *Hullett* 331, 649; *Cantley* 153.—DISTRIB. Malay Islands and eastwards to South China and the Philippines; westwards to Ceylon (C.P. 1803) and Travancore (Wight 1767).

*Climacandra multiflora*, Miq., and *C. salicifolia*, Miq., are probably only varieties of this species, which seems to be a coast shrub only.

22. *ARDISIA KUNSTLERI*, King & Gamble, n. sp. A shrub or small tree, usually 6 to 10 feet high, rising sometimes to 20 feet, and with a stem about 2 to 3 in. in diam.; branchlets thick, dark brown, uppermost and innovations rusty-pubescent, leaf-buds lanceolate. *Leaves* coriaceous-chartaceous; elliptic, or elliptic-oblong, shortly acuminate at apex, cuneate at base; minutely pubescent or scaly on both surfaces, afterwards glabrate; entire or obscurely undulate-crenate on the margins

which are somewhat reflexed, glandular dots many, prominent in the areolations of the leaves and along the margins, 8 to 15 in long, 2.5 to 5 in broad, midrib slender, main nerves 20 to 24 pairs, irregularly spaced, starting at an angle of about  $65^\circ$  with the midrib, at first straight then curving upwards to and along the margin where they anastomose, secondary nerves usually one between each pair of main nerves, reticulations oblique, all raised on the lower surface when dry petiole 1 to 2.5 in long, sometimes shorter, thick, channelled above by the decurrent margins of the blade, which are connivent *Inflorescence* lateral or axillary, a 5 to 7 in long corymbiform minutely pubescent raceme of about 18 to 22 flowers, on a thick flattened peduncle 2 to 4 in long, bracts small, lanceolate, very early caducous, pedicels slender clavate, 7 to 1 in long, curved upwards in flower downwards in fruit buds ovoid, .25 in long *Calyx lobes* orbicular, 1 in long, margins scarious ciliate, covered with many black glandular dots, tube shorter than lobes, minutely pubescent without *Corolla lobes* dark blue without pink within, ovate, acute, 2 in long minutely ciliate prominently dotted tube .05 in long *Stamens* shorter than corolla lobes filaments very short, anthers ovate acuminate, the connective studded on the back with prominent black glands in 2 rows *Ovary* ovoid, glabrous style slender, 1.5 in long *Berry* globose, blueish black 3 in in diam faintly striate when dry

PERAK *Kings Collector* 2207, 2970, 3060, 3264, 4071, 4110, 6486  
*Ridley* 9530

This species is distinguished by its large elliptic leaves comparatively small flowers and large fruits but comes in some respects near to *A. oxyphylla* and in others to *A. solanacea*, and to *A. polycephala* Wall

23 *ARDISIA SOLANACEA* Roxb (on Pl 27 t 27 (1795) Hort Beng 16, Fl Ind I 580, and Fl Ind ed Carey & Wall II 269 A large shrub, reaching 6 to 8 feet in height, bark ash coloured branches stout, glabrous, grey, somewhat angular, buds lanceolate *Leaves* coriaceous oblong or elliptic-oblong, acuminate at apex, cuneate at base, glabrous entire, glandular dots many scattered in the areolations of the nerves and especially near the margin, 6 to 10 in long, 2 to 3.5 in broad, midrib slender, somewhat impressed above, main nerves 12 to 20 pairs, unequally spaced, leaving the midrib at an angle of about  $60^\circ$ , at first straight but soon curving upwards to and along the margin and then anastomosing, secondary nerves many, rather prominent as are the reticulations, petiole stout, 5 to 8 in long, channelled above by the decurrent and often connivent margins of the blade *Inflorescence* of pedunculate corymbiform racemes, bearing 10 to 16 flowers, from the

axils of the upper leaves or of the scars of fallen leaves, 2 to 4 in long, peduncle 1 to 2.5 in long, stout, flattened above as is the very short rachis of the raceme, bracteoles concave, thin, prominently gland dotted, pedicels 7 to 1 in long, more or less clavate, slender at first, thicker in fruit, buds conical, 4 in long. *Calyx lobes* orbicular, ciliate, scarious on the margins, 1.5 to 2 in long, prominently black gland dotted, tube nearly equal to lobes. *Corolla-lobes* pink, ovate, rounded, 3 to 3.5 in long, prominently gland dotted, minutely ciliate on the margins, otherwise glabrous, tube extremely short. *Stamens* about two thirds the length of the corolla-lobes, filaments short, stout, conical, anthers ovate sagittate, 2 in long, acute, apiculate, the back of the connective studded with prominent large black glands in a double row. *Ovary* ovoid, glabrous, style slender, 2.5 in long. *Berry* globose, dark blue or black, 3 in in diam. Willd Sp Pl I 1063, Bot Mag t 1677, Wall Cat 2283 A-K, Mez Monog Myrs 132, fig 20 F-K, Cooke Bomb Fl II 96. *A. humilis*, A DC in Trans Linn Soc XVII 118 (not of Vahl), Wight Ic t 1212, Dalz & Gibs Bomb Pl 137, Clarke in Hook f Fl Br Ind III 529 (in part), Brandis For Fl 287, Kurz in Journ As Soc XLVI II 226, and For Fl II 100, Prain Beng Pl 645. *A. elliptica*, Bodd Fl Sylv p CXXXVIII (not of Thunb.)

PERAK Wray 1900, 3000, King's Collector 6011 — DISTRICT India, Burma

**VAR. *clata***, King & Gamble. A small tree reaching 25 to 35 feet in height, and 6 to 8 in in diam. *Leaves* thinner, oblong lanceolate, main nerves less prominent than in the type. *Inflorescence* with rather longer stouter peduncles and more numerous flowers. *Berry* slightly larger.

PERAK Scortechini 679 King's Collector 4717, 5770

This variety is scarcely worthy of being classed as such but at any rate in the herbarium, the specimens are easily separable.

24. **ARDISIA LURIDA**, Blume Bijdr 687 (1826). A large shrub, reaching 20 feet in height and 3 to 4 in in diam of stem, branchlets thick, glabrous, as are the lanceolate acuminate leaf buds. *Leaves* entire, coriaceous, lanceolate or sub obovate oblong, shortly acuminate at apex, gradually cuneate at base, glabrous and dark green above, pale and ferruginous brown beneath, glands many, regularly scattered in the areoles of the net venation, 5 to 10 in long, 1.5 to 2.5 in broad, midrib prominent, main-nerves 16 to 20 pairs slender, irregular, starting at about 60° with the midrib, parallel at first and then arched up to and along the margin where they meet, secondary nerves similar, reticulations obscure, petiole 4 to 7 in long, winged by the decurrent edges of the blade, the

wings connivent above when dry *Inflorescence* a short (2 to 3 in long), axillary, few-flowered, sub-umbellate, minutely ferruginous pubescent, peduncled raceme, peduncles 1 to 1.5 in long, flattened, pedicels 4 to 6 in in flower, longer in fruit and then clavate, flowers large, waxy, pinkish-white, buds rounded, 4 to 5 in long *Calyx lobes* ovate orbicular, emarginate, scarious and ciliate at the edges, puberulous outside, 2 in in diam, glandular dots conspicuous, of various sizes, black and brown mixed, tube short *Corolla lobes* ovate, obtuse, oblique, concave and keeled, 4 in long, 2 in broad, glandular dots and lineoles prominent, tube very short *Stamens* two thirds as long as petals, anthers hastate, mucronate, opening by longitudinal slits, prominently dotted on the back with large black glands *Ovary* rounded, ending in a short subulate style *Berry* globose, apiculate, 4 in in diam, smooth, gland-dotted A DC Prod VIII 130, Miq Fl Ind Bat II 1019, Scheff Myrs 71, Koord & Val Bijdr V 245, Mez Monog Myrs 130

PERAK *Ridley* 7172, 10319 — DISTRIBUTION Java

25 *ARDISIA OXYPHYLLA*, Wall Cat 2291 (1829) A shrub, branchlets rounded, smooth, buds narrowly lanceolate, glabrous *Leaves* chartaceous elliptic, acute or shortly acuminate at apex, acutely narrowed at base, entire, glabrous above, glabrous beneath except for a few minute scales, glandular dots many, especially near the margin, 3 to 7 in long, 1 to 2.5 in broad, midrib slender, prominent main nerves about 16 pairs, irregular, usually at about an angle of 60° with the midrib, more or less parallel at first, then arching nearly to the margin secondary nerves slender, like the main nerves, reticulations irregular petiole 4 to 7 in long, winged by the decurrent margins the blade *Inflorescence* an axillary, long-peduncled, short, few-flowered (5 to 8) subumbellate raceme, about 2 to 4 in long, peduncles 1 to 2 in long, angular when dry, pedicels 4 in long, 7 in in fruit, slender, buds rounded, 3 in long *Calyx lobes* ovate-rotundate, obtuse, 1 in in diam, ciliate on the scarious edges, prominently dotted with numerous black and brown glands, tube short *Corolla lobes* broadly ovate, subacute or obtuse, oblique, 2.5 to 3 in long, prominently dotted with many black or brown round glands and fewer elongate lineolate ones *Stamens* nearly as long as corolla lobes, almost quite sessile, anthers sagittate, long acute, the connective prominently marked on the back with large black conspicuous glands *Ovary* rounded, ending in a short 1.5 in long style, glabrous *Berry* globose, 3 in in diam, fleshy, smooth A DC in Trans Linn Soc XVII 120, Prod VIII 130, Clarke in Hook f Fl Br Ind III 528 *variety excepted*, Stapf in Trans Linn Soc Ser 2 IV 204, Mez Monog Myrs 131



PENANG : *Wallich* 2291 ; *Curtis* 668 ; *Ridley* 7098. PERAK : *King's Collector* 5624, 5913, 5929, 6185, 8218, 10504. PROVINCE WELLESLEY : *Ridley* 6953.—DISTRIB. Andamans or Tenasserim, *Helfer* (K.D.) 3571, 3585 ; Borneo.

26. *ARDISIA SCORTECHINII*, King & Gamble, n. sp. A tree reaching 40 to 50 feet in height and 8 to 12 in. in diam. ; branchlets round, dark brown, lenticellate, leaf-buds acuminate. *Leaves* entire, coriaceous ; obovate, acute at apex, cuneate at base ; glabrous, margins incurved ; glandular dots many, obscure ; 5 to 7 in. long, 1·5 to 2 in. broad ; midrib prominent slender ; main-nerves 14 to 16 pairs, very oblique, at about 30° to the midrib, curved upwards and joining parallel to the margin, secondary nerves similar but more slender, reticulations curved, surrounding the dots ; petiole 4 in., rather broadly edged by the decurrent margins of the blade, which are nearly connivent above, stipules leafy, more or less persistent. *Inflorescence* 2 in. long, of short axillary peduncled, umbellate racemes 8–12-flowered, in the axils of short leafy bracts, peduncles thick, about 1 in. long, flattened ; pedicels 5 in., thickened and longer in fruit, bracteoles ovate, acute, boat-shaped, deflexed, persistent, flowers reddish-pink. *Calyx-lobes* orbicular, obtuse, 2 to 25 in long, emarginate, ciliate, scarious on the edges, with many parallel veins and many prominent round or oblong mixed black and brown glandular dots ; tube short. *Corolla-lobes* ovate, acute, oblique, 35 in long, unequal, with very few dots, some round some lineolate, tube very short. *Stamens* shorter than corolla-lobes, anthers long acuminate, villous on the connective on both sides, back marked with large black glands, filaments short, very thick. *Ovary* ovoid, surmounted by the conical, subulate, 2 in. long, glabrous style. *Berry* globose, smooth, 3 in in diam., bluish black.

PERAK. *Scortechini* ; *King's Collector* 4662, 4672—on rich soil, in dense jungle, up to 800 feet.

27. *ARDISIA PENDULA*, Mez Monog. Myrs. 125 (1901). Apparently a shrub, branchlets thick, glabrous below, ferruginous-pubescent at the extremities, leaf-buds lanceolate, ferruginous-pubescent. *Leaves* chartaceous, elliptic lanceolate, long acute at apex, cuneate at base ; entire but sometimes very faintly crenate near the apex ; glabrous above, glabrous or slightly ferruginous-pubescent beneath ; glandular dots scattered, more numerous and prominent near the margins, 4 to 7 in. long, 1·5 to 2 in. broad ; midrib slender, main-nerves 10 to 12 pairs, irregular, starting from the midrib at about an angle of 60°, then arching upwards and joining near the margin ; secondary nerves slender, minor nerves reticulate, petiole 3 to 5 in. long, winged by the decurrent edges of the blade. *Inflorescence* of 3 to 5 in. long axillary peduncled ferruginous-

pubescent racemes, peduncles about 2 in, pedicels 4 to 5 in long, curved *Calyx-lobes* ovate, rounded, with many glandular dots, 1 in. long, tube short *Corolla lobes* ovate elliptic, rounded, much gland-dotted *Stamens* shorter than the petals, anthers acute, dotted on the back, filaments very short *Ovary* ovoid, glabrous *Berry* globose, black when dry, 25 in in diam, much gland-dotted 1 *attenuata*, Miq Fl Ind Bat II 1020 and Suppl I 575 (not of Wall), Scheff Myrs 68 *A. reclinata*, Blume, Scheff 1 c

MALACCA Goodenough 1295 —DISTRIB Java, Sumatra A poor specimen only available

28 *ARDISIA HULLFTHII*, Mez Monog Myrs 130 (1901) Apparently a shrub, branchlets light brown, round, smooth, leaf buds lanceolate, glabrous, black *Leaves* membranous, oblong lanceolate, acuminate at apex, acuminate narrowed at base, entire, glabrous on both surfaces, glands light brown, large, in the areoles of beautifully netted venation, 4 to 7 in long, 1 to 2 in broad, midrib slender, impressed above, main leaves many, slender, irregular, 20 to 24 pairs, parallel at first and then arching upwards and joining in a narrow intramarginal ring, secondary nerves many, like the main nerves, reticulations numerous, petiole 4 in long, slender, only very narrowly winged *Inflorescence* an axillary, short, few (1-5) flowered, glabrous, umbellate raceme, peduncle 5 to 7 in long, pedicels 5 in long, recurved, more or less clavate, buds conical, 3 to 4 in long *Calyx-lobes* scarcely overlapping, ovate orbicular, ciliate, 1 to 15 in long, minutely gland dotted, tube short *Corolla lobes* ovate acuminate, upper edges incurved, oblique unequal, many nerved, sparsely black gland dotted, tube very short *Stamens* a little shorter than the corolla lobes, anthers oblong, mucronate, with 2 lines of prominent black glands on the back, filaments short, spreading at base *Ovary* ovoid, thick, glabrous, style short, subulate *Berry* brown, smooth, globose, 2 in in diam, seed whitening at base

MALACCA on Mount Ophir, Hullett 769, 778

29 *ARDISIA OBLONGIFOLIA*, King & Gamble, n sp A shrub, branchlets brown, glabrous, with faint decurrent raised lines from either side of the insertion of the leaf-petioles, leaf-buds lanceolate acuminate *Leaves* chartaceous, oblong, acute at apex, cuneate at base, glabrous, entire glandular dots scattered but not prominent except near the margins which are reflexed, 7 to 10 in long, 2 to 2.5 in broad, midrib prominent, impressed above, main nerves 22 to 26 pairs, starting at an angle of nearly 80° from the midrib, at first straight and near the margin curving upwards to and along it, secondary nerves many, usually at least 1 to 2 between each pair of main nerves, reticulations in an elegant network,

petiole rather slender, .8 to 1 in. long, bordered above by the decurrent margins of the blade. *Inflorescence* an axillary corymbose raceme of about 8 flowers and about .5 in. long on a 1.5 to 2 in. long flattened peduncle; pedicels .75 in. long, clavate. *Calyx-lobes* orbicular, ciliate, gland-dotted, about .1 in. long; tube as long: rest of flowers unknown. *Berry* globose, .2 in. long, glandular-dotted.

PERAK: at 1,000 feet, *Wray* 3797.

30. *ARDISIA TETRASEPALA*, King & Gamble, n. sp. A shrub; branchlets slender, pale brown, with indistinct raised lines from the sides of the leaf-petioles, sinuate, slightly scaly above. *Leaves* chartaceous; elliptic or elliptic-ovate, gradually acuminate at apex, rounded at base; glabrous above, pale brown when dry, very slightly pubescent on and near the midrib beneath; glandular dots many scattered, prominently raised on the upper surface, margins slightly recurved; 4.5 to 6.5 in. long, 1.5 to 2.5 in. broad; midrib prominent below; main-nerves about 16 to 20, irregularly spaced, starting at an angle of 60° from the midrib, curved upwards, dividing and anastomosing with the secondary nerves in a marginal network, all raised beneath; petiole .2 to .3 in. long, channelled above. *Inflorescence* a pseudo-terminal subumbellate 8-12-flowered scarcely .2 in. long raceme in the axil of the uppermost leaf; peduncle about .5 in. long, pedicels slender, about .5 in. long. *Calyx-lobes* 4, ovate-orbicular, ciliate, gland-dotted, about .1 in. long, reflexed in fruit: rest of flower unknown. *Berry* globose, .25 in. in diam, black when dry and prominently dotted with oblong glands.

JOHORE at Jaffaria and Gunong Palai, 1,500 feet, *G. King*.

We place this species in *TINUS* instead of in *TINOPSIS* because not only does the inflorescence seem to be only apparently terminal but its sub-umbellately racemose character seems to approximate more nearly to that of the former section.

31. *ARDISIA BIFLORA*, King & Gamble, n. sp. A small shrub, 4 to 8 feet high; branches smooth, pale brown; branchlets divaricate, slender. *Leaves* chartaceous; oblong-lanceolate, acuminate at both apex and base; glabrous; entire or very faintly crenulate; glandular dots many, black, large, in the areoles of the reticulations; 3 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 12 to 14 pairs, at an angle of about 55° with the midrib, curving upwards to and along the margin where they meet in a wavy intramarginal nerve; secondary nerves many, reticulations irregular; petiole slender, .2 to .5 in. long, sometimes longer. *Inflorescence* a lateral, 2-flowered, pedunculate umbel, 1.5 in. long; peduncle and pedicels each .75 in. long, slender. *Calyx-lobes* ovate, scarious and ciliate on the margins, prominently gland-dotted, .05 in. long; tube as long. rest of flower unknown. *Berry*

black, globose, 25 in in diam, ribbed and prominently gland dotted

**PERAK** in dense jungle on limestone hills at 300 to 800 feet, *King's Collector* 4296, 4711, *Wray* 3343 It is very near *A. paupera*, Mez, of Sumatra, but the long slender peduncle and pedicels distinguish it

A specimen collected by Scortechini (without number) has similar leaves, but the inflorescence is pseudo terminal and branched, with more than 2 flowers and very short pedicels

Ridley's No 2670 from Pahang seems to be *Ardisia rhynchophylla* Clarke but the specimen is imperfect, and we hesitate to describe it as a Malay plant

**32 ARDISIA TAHANICA**, King & Gamble, n sp A shrub (?), branchlets brown, shining, somewhat flattened, innovations scaly and hirsute, leaf buds ferruginous pubescent, lanceolate *Leaves* chartaceous, linear lanceolate, acuminate at both ends, glabrous above, scaly beneath and slightly pubescent along the midrib, margins entire, recurved, glandular dots numerous, scattered, conspicuous on the under surface, 4 to 6 in long, 7 to 9 in broad, midrib slender, main nerves obscure, about 12 pairs, starting at a very oblique angle and curving upwards to and along the margin, secondary nerves similar, reticulations obscure, petiole slender, 4 to 6 in long *Inflorescence* an umbellate peduncled raceme, 1.5 to 2 in long, from the axils of some of the upper leaves, peduncle slender, 7 to 1.2 in long, flowers about 5-8, pedicels slender, 5 in long *Calyx lobes* semi-orbicular, scarious and ciliate on the margins, rusty pubescent on the back and with many glandular dots, .05 in long, tube as long as lobes rest of flower not seen *Berry* globose, depressed, 2 in in diam, prominently striate

**PAHANG** Ridley 2669, in Tahan woods

*Goodenough* No 10752, from Selangor, is also possibly the same species but the leaves reach 1.5 in in breadth and the peduncle and pedicels are stouter

**33 ARDISIA VILLOSA**, Roxb Hort Beng 85 (1814), Fl Ind I 582, and Fl Ind ed Carey & Wall II 274 A small shrub, reaching 6 to 8 feet in height, branchlets rounded, from nearly glabrous to densely ferruginous pilose, the hairs moniliform *Leaves* chartaceous, oblong lanceolate or lanceolate, acute or acuminate at apex, cuneate at base, more or less distinctly but shallowly crenate, the crenations broad, margins recurved, glabrous to minutely rusty hirsute above, densely red-villous beneath, especially on the nerves, glandular dots many, black, prominent, 4 to 8 in long, .75 to .25 in. broad, midrib prominent, main nerves 8 to 12 pairs, very irregular, slender, obscure, arching upwards and ending in the crenature-glands, secondary nerves similar, meeting the main-nerves, reticulations faint, petiole 4 to 8 in

long, rusty villous. *Inflorescence* a sessile or short peduncled, more or less rusty-villous, umbellate raceme at the end of the main branchlets or at the ends of long peduncled axillary 2-leaved branchlets, bracts ovate-lanceolate, 1 to 2 in long, deciduous, pedicels 3 to 4 in long, secund, buds conical *Calyx-lobes* pink, linear oblong or lingulate, obtuse or slightly acute, 2.5 to 3 in long, 0.75 in broad, glabrous to thickly rusty-villous, apex often recurved, glandular lines and dots scattered, tube exceedingly short *Corolla-lobes* pale pink, ovate-acute or -acuminate, 2.5 to 3 in long, prominently dotted with round or oblong glands, much twisted in bud, tube short *Stamens* shorter than the petals, 2 in long, anthers ovate, acuminate, dehiscing by wide pores in the upper half, filaments very short *Ovary* globose, crowned by a slender 2 in long style, the base of the style and top of ovary minutely pubescent *Berry* globose, 2.5 in in diam, bright red, sparingly pubescent A DC Prod VIII 136, Wall Cat 2280a, Miq Fl Jungh 191, Fl Ind Bat II 1017, Scheff Myrs 90, Kurz in Journ As Soc Beng XLVI ii 227 and For Fl II 113, Clarke in Hook f Fl Br Ind III 525 *var excepted*, Koord & Val Bijdr V 253 *A vestita* Wall in Roxb Fl Ind ed Carcy & Wall II 274, A DC lc, Miq lc, Mez Monog Myrs 141 *A mollis*, Bl Bijdr 689 *A tavoyana*, A DC in Trans Linn Soc XVII 125

PENANG *Mangay* (K D) 1011, *Ridley* 9357, *Curtis* 1597 PIRAK *Scortechini* 638, *Wray* 151, 862, 2967, 3149, *King's Collector* 1819, 3138, 6104, 6448, 7915, 10052 PAHANG *Ridley* 2176 SELANGOR *Ridley* 1558, *Curtis* MALACCA *Griffith* (K D) 3588, *Hance*, *Ridley*, *Cuming* 2390 SINGAPORE *Ridley*, 2833, 2816 — DISTRIB Burma, Sumatra, Java, Borneo, and eastwards to Tonkin and Hainan

VAR *glabrata*, Kurz lc *Leaves*, at least when full grown, glabrous (*calyx* glabrous or nearly so *Stapf* in Trans Linn Soc Ser 2, IV 204 *A glabrata*, Bl Bijdr 692, A DC Prod VIII 136, Miq Fl Ind Bat II 1022

PIRAK *Ridley* 2899, *Wray* 2801, 3414, *King's Collector* 949, 4612, 6188, 6255, 7696, *Scortechini* 315 — DISTRIB Java, Sumatra, Borneo

*Ridley* s 5510 from Kedah seems to be a form of this with smaller leaves and shorter calyx lobes but can hardly be separated as a second variety

34 ARDISIA VIRENS, Kurz For Fl II 575 (1877), and Journ As Soc Beng XLVI ii 226 A small glabrous shrub, branchlets slender, pale, somewhat compressed and twisted *Leaves* membranous, oblong or oblong lanceolate, acuminate at apex, cuneate at base, faintly

crisped-crenulate with large glands in the crenulations, pale and glabrous on both surfaces, glandular dots scattered, in the areoles of the reticulations, 4 to 6 in long, 1.5 to 2 in broad, midrib prominent, somewhat impressed above, main-nerves about 12 to 14 pairs, irregular and irregularly spaced, usually starting at an angle of about 60° with the midrib, at first straight, branching and joining in an intramarginal nerve close to the margin and passing through the crenature glands, secondary nerves many, slender, reticulations many, curved, petiole 4 to 6 in long, winged by the decurrent margins of the blade. *Inflorescence* an almost sessile terminal corymb, composed of long peduncled sub umbellate racemes, peduncles 1 to 1.5 in, pedicels 5 to 8 in long, buds conical 2.5 in long. *Calyx lobes* oblong, obtuse, thin, 0.75 in long, conspicuously dark brown gland dotted, tube short. *Corolla lobes* ovate, bluntly acuminate, oblique, unequal, conspicuously marked by few dark brown lines and dots, 3 in long, tube very short. *Stamens* shorter than corolla lobes, 2 in long, obtusely hastate anthers opening by broad longitudinal slits, conspicuously black gland dotted on back, filaments short. *Ovary* rounded, style slender, 2 in long. *Berry* globose, pale, somewhat depressed, 3 to 4 in in diam, conspicuously marked with round or oblong purple dots, somewhat fleshy. Clarke in Hook f Fl Br Ind III 524, Stapf in Trans Linn Soc Ser 2, IV 203, Mez Monog Myrs 147

PERAK Wray 1444 at 2,000 feet—DISTRIB Assam, Cachar, Manipur, Yunnan, Borneo

35 *ARDISIA WRAYI*, King & Gamble, n sp. A single stemmed treelet or shrub reaching 5 feet in height, but usually smaller, upper part of stem 2.5 in thick, brown, with spongy bark and scurfy scales, leaf buds glabrous, lanceolate acuminate. *Leaves* membranous, oblong lanceolate, long acuminate at apex, long cuneate at base, margins recurved, somewhat scaly on both surfaces, scurfy along the midrib beneath, glandular dots prominent scattered, broadly crenate, the crenatures shallow with large glands, deep green above, red or purple beneath, 6 to 10 in long, 1.5 to 3 in broad, midrib slender, main nerves 12 to 20 pairs, irregular in angle and distance, curving upwards to and along the margin where they or their branches end in the glands of the crenatures, secondary nerves few, reticulations many scarcely prominent, petiole 7 to 1.3 in long, somewhat flattened, bordered by the decurrent margins of the blade. *Inflorescence* of glabrous sub umbellate racemes from the axils of the uppermost leaves, usually crowded so as to present almost the appearance of a terminal cluster, peduncles usually 5 in long, occasionally shorter but often longer, even up to 2 in, flattened, racemes very short, much marked by the scars of very

caducous bracteoles, flowers 8 to 12, pedicels slender below, flattened above, twisted and curved, 3 to 4 in. long, buds ovoid *Calyx-lobes* ovate, acute, 1 in long, prominently black-gland-dotted *Corolla-lobes* waxy, reddish or purple, ovate, 15 to 2 in long, sparsely gland-dotted. *Stamens* nearly as long as corolla-lobes, filaments very short, thick, anthers ovate, acute, connective much gland-dotted on back *Ovary* rounded, style short, slender, glabrous *Berry* globose, red, rugose, 3 in in diam, prominently gland-dotted when dry

PERAK Wray 438, 2795, 3280, 4051, *Scortechini* 418, *King's Collector* 1888, 3631, 6938, 7514, in dense jungle on rich soil, both in low-level localities and up to 4,000 feet in the mountains, one specimen, rather more slender, thinner and more glabrous, from the top of rocks (K C 7514)

K C No 6938 from mountains at 3 000 to 4,000 feet, has the main nerves nearly at right angles to the midrib, while other specimens have it at 60° or even 45°, these are, however, intermediate and all that can be said is that the character is a variable one. The species seems to resemble the *A. macrocarpa* Wall, of Northern India, in its habit of growth

36 ARDISIA MINOR, King & Gamble, n sp. Apparently a short (12 to 18 in high) treelet or undershrub, lower part of stem with side rootlets, stem 2 to 25 in thick, rusty pubescent, dark brown *Leaves* coriaceous, elliptic, long caudate-acuminate at apex, attenuate or cuneate at base often unequally, margins recurved, very shallowly crenate, the crenatures with large prominent glands, glabrous on both surfaces but somewhat scaly, 5 to 7 in long, 2 to 25 in broad, midrib slender, main nerves about 15 pairs, starting at an angle of about 50° with the midrib, and thence straight to the margin where they or their branches end in the crenature glands, secondary nerves similar to the main nerves, reticulations oblique, all raised beneath when dry, petiole thick, rugose, rusty-pubescent, 7 to 1 in long, winged by the decurrent margins of the blade *Inflorescence* of very short, rusty-pubescent, umbellate racemes of about 5 to 6 flowers from the axils of the uppermost leaves, peduncle scarcely 2 in long, thick, racemes about 2 in long, bracteoles many, ovate or oblong, recurved, pedicels thick, 3 to 4 in long, flattened, recurved *Calyx-lobes* ovate acute, 1 to 15 in broad, glabrous, prominently gland-dotted, nearly free *Corolla-lobes* ovate acute, 2 in long, glabrous, dotted prominently with large black glands *Stamens* shorter than corolla-lobes, filaments very short, thick, anthers oblong acuminate, the connective gland-dotted at the back, 1 in long *Ovary* rounded, glabrous, style 1 in. long, subulate *Berry* not known.

PERAK *Scortechini*

Very near *A. Wrayi*, but differs especially in the coriaceous leaves and the shorter and much thicker pedicels

37 *ARDISIA PERAKENSIS*, King & Gamble, n sp. A small bush, branchlets pale brown, smooth, wrinkled when dry, innovations densely rusty-glandular-pubescent. *Leaves* membranous, elliptic lanceolate, long acute both at apex and base, nearly glabrous on both surfaces but with small peltate scales, young leaves rusty glandular pubescent, margin slightly recurved, shortly and shallowly crenate or nearly dentate except on the lower third and at the apex, glands in the crenatures present, obscure, glandular dots absent or very sparse, 2.5 to 4 in long, .75 to 1.25 in broad, midrib slender, main nerves about 16 pairs, rather irregular in angle and distance, meeting near the margin in an irregularly looped intramarginal nerve, reticulations many, transverse, all raised on lower surface, petiole slender, 2 to 4 in long, bordered by the decurrent margins of the blade. *Inflorescence* of small, 2-3 flowered, rusty-glandular, pubescent, pedunculate umbels from the axils of upper leaves or of reduced bract like leaves, peduncles 3 in long, pedicels 1 to 2 in long, bracteoles ovate, minute, buds ovoid, pale pink. *Calyx lobes* triangular ovate, acute, minutely pubescent and gland dotted, .05 in long. *Corolla lobes* ovate, acute, 1 to 1.5 in long, glabrous, sparsely black gland dotted. *Stamens* a little shorter than corolla-lobes, filaments almost none, anthers ovate, acute, 1 in long. *Ovary* rounded, glabrous, style subulate, .075 in long. *Berry* not known.

PERAK at 300 feet in Upper Perak, Wray 3462

38 *ARDISIA MEZIANA*, King & Gamble, n sp. A herbaceous under-shrub, 1 to 2 feet in height, stem 2 in in diam, bark soft, pale brown, upper parts and innovations rusty glandular pubescent. *Leaves* chartaceous, elliptic obovate, shortly and abruptly acuminate at apex, cuneate at base, glabrous above, sparsely glandular pubescent beneath, margins rather narrowly crenate dentate except in the lower third to half and at the acumination, recurved, glands in the crenatures obscure, glandular dots many, scattered, inconspicuous, 3.5 to 5.5 in long, 1.5 to 2 in broad, midrib slender, main nerves 10 to 14 pairs, at an angle of about 60° with the midrib, at first straight afterwards curved upwards to anastomose near the margin, secondary nerves few, reticulations oblique, all more or less raised on both surfaces when dry, petiole 3 to 5 in long, somewhat thickened below, densely rusty-glandular-pubescent. *Inflorescence* of very short, sessile, rusty glandular-pubescent racemes of about 6 flowers each, in the axils of the leaves all



down the stem, the racemes .1 to .15 in. long; bracteoles ovate, scarious, conspicuously black-gland-dotted and ciliate; pedicels short, .1 to .15 in. long, stout; buds ovoid; flowers waxy-white. *Calyx-lobes* 5, ovate, acute, ciliate, hyaline, with conspicuous black dots, .05 in. long, tube as long as lobes. *Corolla-lobes*, ovate, blunt, .1 in. long, conspicuously black-gland-dotted; tube very short. *Stamens* nearly as long as corolla-lobes; filaments short, thick; anthers ovate-lanceolate, long apiculate, the connective studded on the back with large black glands. *Ovary* rounded, style filiform as long as corolla. *Berry* not seen.

PERAK. on limestone rocks in open jungle at 500 to 800 feet, *King's Collector* 5838.

We have dedicated this well-marked species to C. Mez, whose Monograph of MYRSINÆ has done so much for the elucidation of the Natural Order, and whose study of *Ardisia* in particular has been of so much help to us.

39. *ARDISIA RIDLEYI*, King & Gamble, n. sp. A slender shrub or treelet, reaching 10 to 15 feet in height and about 1 in. in diam.; branchlets dark brown, slender, minutely ferruginous-pubescent; leaf-buds lanceolate, densely ferruginous-pubescent. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, acuminate or somewhat rounded at base; prominently crenate, the crenatures usually regular, margin slightly recurved; glabrous on both surfaces; glandular dots few, scattered; 4 to 8 in. long, 1.25 to 1.75 in. broad, midrib slender; main-nerves about 12 pairs, at irregular angles and spaces, ending in the crenatures of the margin; secondary nerves and reticulations obscure; petiole .2 to .7 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a 3-6-flowered, sessile, umbellate raceme in the axil of the uppermost leaf of the branchlets; raceme about .2 in. long; pedicels slender, .7 to 1.4 in. long, minutely rusty-pubescent; buds ovoid, acute. *Calyx-lobes* 5, broadly triangular, acute, .075 in. long, sparsely black-gland-dotted, rusty-pubescent. *Corolla-lobes* broadly ovate, acute, .15 in. long, glabrous, densely and closely black-gland-dotted. *Stamens* a little shorter than the corolla-lobes; filaments very short, thick; anthers oblong, hastate, mucronate, .1 in. long. *Ovary* rounded, glabrous, style slender, .05 in. long. *Berry* dark red, ovoid, apiculate, sparsely striate and gland-dotted, .25 to .3 in. in diam.

PERAK: in dense forest at 2,500 to 4,500 feet, *Wray* 209; *King's Collector* 5019. SELANGOR: *Ridley* 8534. SINGAPORE: *Ridley* 6434.

Very like *A. crenata* var. *angusta* but has broader and thinner leaves, differently nerved.

40. *ARDISIA CRENATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583,

and Fl Ind ed Carey & Wall II 276 An evergreen small glabrous shrub, branchlets thick, somewhat fleshy, striate with faint lines decurrent from the bases of the leaves, leaf buds small, conical *Leaves* chartaceo-coriaceous, lanceolate to oblong lanceolate, acute or sub-obtuse at apex, acuminate narrowed at base, margins crispately crenate with glands in the crenatures, recurved, glabrous on both surfaces, glandular dots scattered in the areoles of minor nerves, sometimes prominent, often obscure, 2 to 4 in long, 75 to 15 in broad, midrib slender, main nerves 10 to 14 pairs, irregular, slender, arching upwards and joining in an intramarginal nerve close to the margin which passes through the crenature glands, secondary nerves similar but fainter, reticulations curved, petiole 2 in long, narrowly winged by the crisped edges of the decurrent blade *Inflorescence* of short, sessile or shortly peduncled, paniced racemes, springing from the branchlets just below the terminal pair of leaves, pedicels 2 to 4 in long, slender, longer and thicker in fruit, generally recurved, buds conical, 15 to 2 in long, flowers 4 or 5 merous, waxy pink or white *Calyx* lobes ovate, 05 to 1 in long, scarious at the edges, dotted with black glands in the middle, tube very short *Corolla* lobes rose pink, ovate oblong, bluntly acuminate, 2 in long, oblique, unequal, sparsely dotted with round or elongated glands, sometimes papillose at the base within *Stamens* shorter than corolla lobes, anthers ovate oblong, acute, with few glands on the back, filaments very short *Ovary* ovoid, surmounted by a twisted subulate slender style 15 in long *Berry* globose, 25 in in diam, scarlet, succulent obscurely striate, crowned by the persistent style Wall Cat 2262, Bot Mag t 1950, Clarke in Hook f Fl Br Ind III 524, Koord & Val Bijdr VI 190 *A glandulosa*, Bl Bijdr 690 (not of Roxb) *A crenulata*, Lodd Bot Cat t 2 (not of Vent) *A crispa*, A DC in Trans Linn Soc XVII 124 and Prod VIII 134, Scheff Myrs 72, Miq Fl Ind Bat II 1020, Kurz in Journ As Soc Beng XLVI ii 226 and For Fl II. 113, Mez Monog Myrs 144, fig 22 *A densa* and *A polysticta*, Miq Fl Ind Bat Suppl 575, 576 *Bladhia crispa*, Thunb Fl Jap 97, Kaempf Ic Pl Jap t 7

KEDAH Ridley 5517 PENANG Wallich 2262, Marngay (K D) 1009, Phillips, Curtis 337, Deschamps, G King, J Scott MALACCA Griffith (K D) 3583/1, Cuming 2254, Hullett 637, Derry 944 PERAK Scortechini, Wray, 1257, King's Collector 1337, 4180, 4903, 7817 8706, 10566 SELANGOR Ridley 10553 PAHANG Ridley 24, Haviland JOHORE Fox 11285 —DISTRIB Assam, Burma, Sumatra, Java, Borneo, and eastwards to South China and Japan Ridley (Trans Linn Soc III (1893) 317) says the berries are "sweet and eatable"

VAR *angusta*, Clarke, l.c. *Leaves* narrowly lanceolate, flowers in a simple umbellate raceme, pedicels divaricate, buds obtuse

MALACCA *Griffith* (K D) 3584.

41 *ARDISIA ROSEA*, King & Gamble, n sp A small shrub reaching 4 to 6 feet in height, branchlets divaricate, purplish-brown when dry, glabrous, buds lanceolate *Leaves* membranous, elliptic, cuspidately acuminate at apex, cuneate at base, broadly crenate with shallow crenatures and prominent glands, the margin recurved, glabrous on both surfaces, glandular dots extremely numerous, prominent on the under surface which is paler than the upper when dry, 2 to 4 in long, 1 to 1.5 in broad, midrib slender, main-nerves obscure, 8 to 12 pairs, irregular, branching and usually ending in the crenature-glands, secondary nerves and reticulations indistinct, petiole red, slender, .25 to .5 in long, bordered by the decurrent crisped margins of the blade *Inflorescence* a corymbiform terminal or pseudo-terminal panicle of umbellate racemes, the branches divaricate, minutely rusty-pubescent, common peduncle, above the last leaf, short, about .05 in, branch peduncles slender, .5 to 1 in long, pedicels slender, 2 to 4 in long, up to 5 in long in fruit, flattened in flower, flowers in each umbel about 12, usually recurved, buds ovoid, acute *Calyx lobes* 5, triangular ovate, .05 in long, glabrous, not glandular, tube as long as lobes, lobes reflexed in fruit *Corolla lobes* waxy-white tinged with pink, or pink only, ovate acuminate, 2 in long, much twisted to the left, not glandular *Stamens* nearly as long as corolla lobes, filaments slender, .05 in long, anthers ovate, blunt, 1 in long, with very few glands *Ovary* rounded, glabrous, style filiform, .15 in long *Berry* black, globose, .25 in in diam, smooth, tipped with the long slender persistent style

PERAK *Wray* 32, 402, *Scortechini* 295, 664, *Ridley* 5511, 9720, *King's Collector* 3247, 6247, 8057, in dense forests in the mountains from 3,000 feet elevation to the top of Gunong Batu at 6,700 feet

42 *ARDISIA LONGEPEDUNCULATA*, King & Gamble, n sp A shrub, branchlets slender, rusty-pubescent, divaricate *Leaves* membranous, oblong lanceolate, long acuminate at apex, attenuate at base, crenulate with shallow glandular crenatures, margin recurved, glabrous on both surfaces, pale beneath when dry, glandular dots many, scattered, prominent on the under surface when dry, 4 to 6 in long, 1.25 in broad, midrib slender, main-nerves 12 to 16 pairs, curved upwards to and along the margin usually to end in the crenature-glands, secondary nerves and reticulations obscure, petiole slender, .5 in long, bordered by the decurrent crisped margins of the blade *Inflorescence* a terminal

pyramidal panicle of long peduncled racemes, 5 to 6 in long and 6 to 9 in broad, branches and rachis all rusty pubescent, common peduncle about 1 in long, branch peduncles 2 to 3 in long, at right angles to the rachis and curved upwards, racemes about 5 in long, about 8-flowered, pedicels slender, somewhat clavate, twisted, 5 to 1 in long, bracteoles subulate, caducous, buds ovoid, acuminate *Calyx lobes* triangular, blunt, 0.5 in long, rusty pubescent, tube as long *Corolla lobes* pink, ovate, long acuminate, 2.5 in long, rusty pubescent within, not gland dotted, tube very short *Stamens* much shorter than corolla-lobes, anthers oblong, acute, filaments very short *Ovary* rounded, style subulate, 2.5 in long *Berry* purplish black, globose, 2 in in diam

PERAK at low levels, Wray 296

43 *ARDISIA MAINGAYI*, King & Gamble A "bush or small tree (Wray), "slender tree" (Scortechini), branchlets smooth, bark brown, pith rather small, innovations glandular-pubescent *Leaves* membranous, sub opposite or falsely whorled, elliptic obovate or obovate lanceolate, attenuately or abruptly acuminate at apex, attenuately cuneate at base, glabrous on both surfaces except for a few scattered glandular hairs, pale beneath margin finely toothed except on the lower third, the teeth caudate and glandular, 6 to 11 in long, 2 to 3.5 in broad, midrib slender above, thickened below, main nerves 15 to 20 pairs, irregular in angle and distance, but usually at about 50° with the midrib, straight for about half way and then curved to and along the margin, secondary nerves and reticulations very faint petiole none or very short, the base of the leaf almost half stem clasping *Inflorescence* of slender, 6 to 8 in long, sparsely glandular pubescent, panicles of long peduncled sub umbellate racemes, from the axils of upper leaves, of abortive leaves, or of the scars of fallen leaves below them, common peduncle slender, 2 to 3 in long, branch peduncles very slender, divaricate, 5 to 1.5 in long, supported by linear subulate 2 to 3 in long bracts, racemes 3 to 5 in long, 8-12 flowered, bracteoles small, subulate, pedicels slender, flattened above, buds ovoid acute *Calyx lobes* ovate, obtuse, 0.5 to 1 in long, recurved in fruit, minutely pubescent, ciliate on the margins *Corolla lobes* white, ovate, acute or acuminate, 1.5 in long, glabrous, gland-dotted *Stamens* much shorter than corolla lobes, filaments short, dilated at base, anthers oblong, bluntly mucronate, 1 in long *Ovary* rounded, glabrous, style slender, 0.5 in long *Berry* red, 3 in in diam, longitudinally ribbed when dry *A. odonto phylla*, Wall, var *Maingayi*, Clarke in Hook f Fl Br Ind III 526

PERAK Wray 304, 953, 1597, Scortechini 335, 339, Curtis

MALACCA: *Maingay* (K.D.) 1016, in the mountains about 4,500 feet and below.

Although Wray and Scortechini describe this more or less as a "tree," *Maingay's* specimen is that of a semi-herbaceous undershrub about 24 in. high, sending out roots from above the ground-level.

44. *ARDISIA THEÆFOLIA*, King & Gamble, n. sp. A small shrub reaching 3 feet in height; branchlets brown, smooth, the uppermost parts and innovations rusty-glandular-pubescent. *Leaves* chartaceous; elliptic, long acuminate at apex, acuminate at base; alternate or sub-opposite or falsely whorled; minutely glandular-pubescent on both surfaces, scaly beneath; margins recurved, finely toothed except on the lower third and on the acumination, the teeth erect, glandular; glandular dots very numerous and prominent on both surfaces; 2 to 3 in. long, .7 to 1.2 in. broad; midrib slender; main-nerves 10 to 14 pairs, close, curved upwards to near the margin, reticulations obscure; petiole .4 in. long, bordered by the decurrent margins of the blade. *Inflor-escence* a 1.5 to 2.5 in. long panicle with short racemose branches in the axil of a leaf or of a subulate .2 in. long linear abortive leaf between the leaves on the upper part of the branches; branches .5 in. long, slender, divaricate; bracteoles minute, linear; flowers 2 to 5 in each raceme, buds ovoid *Calyx-lobes* 5, rounded, .05 in. long, ciliate. *Corolla-lobes* 5, white, ovate, acute or obtuse, .15 in. long, gland-dotted. *Stamens* as long as corolla-lobes; filaments very short; anthers broadly oblong, mucronate. *Ovary* rounded, gradually produced in an erect or curved style, 1 in. long. *Berry* pyriform or nearly globose, .2 in. in diam, smooth, slightly ribbed when dry.

PERAK: on Ulu Batang Padang at 4,900 feet, Wray 1513; Scortechini.

45. *ARDISIA ODONTOPHYLLA*, Wall. Cat. 2279 (1829) (*not of* Lindl.), A. DC. Trans. Linn. Soc. XVII 125, t VI., Prod. VIII. 135; Clarke in Hook f. Fl. Br. Ind. III. 525; Mez Monog. Myrs. 150. *A. pavonina*, Herb Hamilt. *vide* DC. in Prod. l.c.—DISTRIB. India (Assam and Cachar).

VAR *Lobbu*, Clarke in Hook. f. Fl. Br. Ind. III. 526 An almost herbaceous undershrub reaching to about 2 feet in height, the stems rooting from nodes near the base; bark fleshy, pale brown, pith large; upper part of stem densely fulvous-villous; leaf-buds small, short. *Leaves* membranous, sub-opposite; elliptic or elliptic-oblong or obovate-lanceolate, acute at apex, cuneate at base and sometimes slightly rounded, the margins sharply serrate except for a short distance near the base; glabrous above except on the hirsute midrib, rusty-tomentose beneath, the midrib and main-nerves usually ferruginous-

villous on the lower surface, glands scattered, not prominent, 4 to 8 in long, 1.5 to 3.5 in broad, midrib thick, prominent, main-nerves 8 to 12 pairs, prominent, irregular in distance and angle, curving upwards to and along the margin, secondary nerves few, reticulations transverse, petiole variable, stout, 4 to 1 in long, ferruginous villous, rarely glabrescent. *Inflorescence* of short (under 1 in long) lax, few flowered, pubescent, simple or compound, umbellate racemes, from the axils of leaves below the summit or of a linear subulate abortive leaf about 5 in long, peduncles slender, 5 to 2 in long, pedicels slender, 3 to 7 in long, recurved, bracteoles short, subulate, buds ovoid. *Calyx* lobes ovate, obtuse, ciliate, 1 in long, slightly pubescent marked with faint brown striæ, tube short. *Corolla* lobes pink, ovate, obtuse or bluntly acuminate, 1.5 to 2 in long, unequal, marked with many light brown linear and round glands, tube short. *Stamens* half the length of the petals, anthers broad, oblong, 1 in thick, emarginate filaments very stout. *Ovary* ovoid, gradually narrowed into a slender subulate style 1 in long, the top of the ovary and base of the style short pubescent. *Berry* globose, scarlet, fleshy, .25 in in diam., smooth.

PERAK *Wray* 2285, 2975 *King's Collector* 2583, 2978, 3053 7367  
 SELANGOR *Ridley* 7560 PAHANG *Ridley* 2270, 5825 SINGAPORE  
 Lohb 316, an undershrub of dense forests in wet localities

*Ridley's* Pahang specimens have smaller leaves and longer calyx lobes, with fewer flowered inflorescences, the whole plant more thickly tomentose villous but do not seem capable of separation.

46 *ARDISIA BAMBUSLIORUM*, King & Gamble, n. sp. A small semi-herbaceous shrub 1 to 2 feet high, stem pale brown about .25 in in diam. bark spongy, pith large. *Leaves* membranous, oblong or oblong lanceolate or obovate-oblong, acute at apex, narrowly attenuate at base and slightly rounded, glabrous on both surfaces, slightly scaly only beneath, glands few, scattered, chiefly near the margin, margins very finely and irregularly toothed, usually recurved, 4 to 6 in long, 1 to 1.5 in broad, midrib slender, main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curved upwards, and often branching, to and along the margin, where they anastomose in a rough intramarginal nerve, secondary nerves few, reticulations oblique. *Petiole* 4 to 6 in long, channelled above. *Inflorescence* of lateral pedunculate racemes 1 to 1.5 in long supported by a linear abortive leaf 5 in long, peduncle 7 to 8 in long, raceme the same. *Bracteoles* small subulate about 1 in long, pedicels slender, clavate, 4 to 5 in long recurved, buds ovoid, flowers white.

*Calyx-lobes* 5, linear-oblong, acute, reflexed, .05 to .07 in. long, not gland-dotted. *Corolla-lobes* ovate-oblong, .15 in. long, dotted with elongated brown glands. *Stamens* shorter than the corolla-lobes; filaments short; anthers oblong, obtuse, emarginate, .1 in. long. *Ovary* rounded, glabrous; style slender, curved, .1 in. long. *Fruit* not seen.

PERAK. in dense bamboo forest, King's Collector 10095.

This is scarcely more than a var. of *A. odontophylla*, but is recognised by the somewhat different leaves, white flowers, glabrous ovary and style, and the absence of fulvous tomentum.

## 6. ANTISTROPHE, A DC.

Slender shrubs, with puberulous branchlets. *Leaves* alternate, entire or dentate, lanceolate, acuminate, glandular, petiole margined. *Flowers* hermaphrodite, in sub-sessile axillary umbels or solitary, pedicels slender, bracts small. *Calyx* small, 5-lobed, persistent; lobes acute, imbricate. *Corolla* deeply 5-cleft; lobes lanceolate acuminate, overlapping to the left in bud. *Stamens* 5, inserted on the throat of the corolla; filaments short, anthers free, hastate-lanceolate, the connective produced upwards in a membranous tip, cells dehiscing longitudinally and introrsely. *Ovary* ovoid, attenuated in a filiform style, stigma punctiform; ovules many on a globose central placenta. *Fruit* a globose berry, pericarp coriaceous, endocarp chartaceous. *Seed* 1, albumen ruminated; embryo cylindric, transverse.—DISTRIB. Species 4, Indian and Malayan.

Inflorescence 1-2-flowered, glabrous; leaves caudate acuminate .. 1. *A. caudata*  
 Inflorescence 4-6-flowered, hirsute; leaves short acuminate .. 2. *A. Curtisi*.

1. ANTISTROPHE CAUDATA, King & Gamble, n. sp. A shrub or small tree, branches smooth, divaricate, nearly glabrous, branchlets puberulous, with faint raised lines from the bases of the leaf-petioles; innovations rusty-pubescent. *Leaves* membranous, elliptic-lanceolate, caudate-acuminate at apex, attenuate or somewhat rounded at base; entire or undulate on the margins; glabrous on the upper, minutely puberulous or glabrous and with pale peltate scales on the lower, surface, glandular dots very many, scattered, prominent; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, conspicuous below; main-nerves 8 to 12 pairs, prominent beneath, at an angle of about 60° with the midrib, arching upwards, forking and obscurely anastomosing near the margin, the lowest pair of nerves more oblique than the rest; secondary nerves short, slender, reticulations indistinct, petiole .1 to .2 in. long, edged by the decurrent margins of the blade which are almost connivent above. *Inflorescence* of short, axillary, usually only 1-2-flowered sub-

sessile umbels, with very minute bracts, pedicels slender, clavate, .4 in. long, buds conical, long acuminate, 3 in long, glabrous *Calyx-lobes* ovate, acute, .05 in long, ciliate on the edges, gland-dotted in two central lines *Corolla-lobes* ovate, long-caudate-acuminate, 3 in long, glabrous, dotted with few elongate glands *Stamens* inserted at the base of the corolla-lobes and nearly as long as them (.25 in), anthers sagittate-lanceolate with prominent rows of glands on the back, connective produced upwards in a membranous tip *Ovary* ovoid, glabrous, style subulate, .25 in long, very slender *Berry* globose, .25 in in diam, smooth, obscurely vertically striate

PERAK at Gunong Batu Pateh, 3,400 feet, *Wray* 456, 978, 3242, *Curtis* 3324

This species at first sight resembles *A. oxyantha*, A. DC., of North East India, but has smaller and differently veined leaves, with different glands and smaller flowers

2 ANTISTROPHE CURTISII, King & Gamble, n. sp. A shrub (?), branchlets round, rusty-glandular-hirsute, zigzag, with faint raised lines from the bases of the petioles of the leaves, innovations densely rusty glandular-hirsute *Leaves* membranous, elliptic or obliptio-oblong, acuminate at apex, rounded at base, entire, nearly glabrous above except on the midrib, sparsely rusty hirsute beneath, .35 to .5 in long, 1.5 to 2 in broad, midrib slender, raised beneath, main nerves about 10 pairs, at about an angle of 50° with the midrib, curved upwards, forked and broadly anastomosing near the margin, lowest pair not more oblique than the others, secondary nerves and reticulations obscure, petiole 2 in long, crispedly channelled above *Inflorescence* of densely rusty-hirsute, sub sessile, axillary, 4-6 flowered, umbellate racemes, 1 to 1.5 in long, bracteoles subulate, .05 in long, pedicels slender, .3 to .5 in long, buds caudate-acuminate, 3 in long *Calyx lobes* linear subulate, 1 in long, densely rusty hirsute *Corolla lobes* ovate at base, long caudate-acuminate, .3 in long, scarcely dotted, 3-5 nerved, sparsely hirsute without *Stamens* rather shorter than the corolla-lobes, connivent in a cone, anthers sessile, lanceolate sagittate, the back with 2 rows of prominent round or elongate glands, the connective produced in a blunt membranous tip *Ovary* ovoid, style slender, as long as anthers *Berry* not seen

PERAK in Kuran Valley, below the gap, 4,000 feet, *Curtis* 3390

## 7 ÆGICERAS, Gaertn.

Sea-coast shrubs, or small trees, branches cylindric, glabrous *Leaves* scattered, petioled, entire, glabrous, alternate. *Flowers* large



(for the Order) white, pedicellate, without bracteoles, in terminal or axillary umbels or panicles, pedicels slender *Calyx* 5-lobed, lobes obtuse, coriaceous, twisted to the left, overlapping to the right, tube none *Corolla* with short tube, lobes 5, acute, overlapping to the right in bud, afterwards recurved *Stamens* 5, inserted on the corolla-tube, filaments elongate, connate into a tube below, anthers with transversely septate cells, cordate lanceolate, introrse, dehiscing longitudinally *Ovary* fusiform, narrowed into an elongated style, stigma acute, ovules many, immersed in a central globose placenta *Fruit* cylindric, curved, acute, coriaceous, 1 seeded, pericarp coriaceous, afterwards splitting, testa membranous *Seed* elongate, exalbuminous, radicle inferior, enlarged at the base, joined with the cotyledons into a cylindric tube, germination often taking place while still on the plant, as in some *Rhizophoræ* — **DISTRIB** Two species, of the sea coasts of India, Buma, the Malay Peninsula and Islands, to South China and tropical Australia

*ÆGICLAS MAJUS*, Gaertn Fruct I 216, t 46, fig 1 (1788) A shrub or small tree reaching 15 to 20 feet in height, evergreen, all parts glabrous, branches greyish black, smooth, branchlets reddish *Leaves* coriaceous, obovate, rounded obtuse or emarginate at apex sometimes even obcordate, cuneate at base, margins recurved, glandular dots many, inconspicuous, 15 to 35 in long, 1 to 15 in broad, midrib slender, raised above or sometimes depressed, main nerves about 10 pairs, slender, raised above, straight at first then curving upwards, secondary nerves slender, few, reticulations not prominent, petiole 2 to 3 in long, thick, bordered by the decurrent margins of the blade *Inflorescence* a terminal, axillary or leaf opposed many (15 to 20) flowered umbel, sessile or very short peduncled, bracts oblong lanceolate, deciduous, pedicels slender 3 to 5 in long, buds conical *Calyx* lobes concave, gibbous at the base, broadest at top 25 in long, 15 in broad, with parallel veins and scattered black dots in the lower part *Corolla* lobes ovate, acuminate, glabrous, parallel veined, 25 in long, recurved, tube as long as lobes, villous hairy within *Stamens* longer than corolla lobes, exsert, filaments connate half way up, linear, connate part densely villous, free part glabrous 2 in long, anthers 1 to 15 in long, dorsifixed, cells prominently septate *Ovary* ovoid, surmounted by a subulate angular style, 3 in long, black gland dotted below *Fruit* a long acuminate pale brown capsule, up to 3 in long, 25 in in diam, glabrous *Seed* 1, elongate, filling the capsule, embryo inverse, funicle very long Willd Sp Pl I 1185, Roem & Schult Syst Veg JV 511, Roxb Fl Ind III 130, A DC in Ann Sc Nat 2, XVI t 9A, and Prod VIII

142, Wight Icon t 146, Miq Fl Ind Bat II 1031, Scheff Myrs 97, Benth Fl Austral IV 277, Dalz & Gibs Bomb Fl 137, Bedd Fl Sylv CXXXIX Anal pl XIX III, Clarke in Hook f Fl Br Ind III 533, Trimen Fl Ceyl III 74, Cooke Fl Bomb II 88, Koord & Val Bijdr V 276, Pax in Engl & Prantl Pflanzenfam IV 1 97, fig 57 Schimp Strandfl 44, figs 1, 2 Prain Beng Pl 645 *Æ fragrans*, Koenig Ann of Bot I 129, t 3 Wall Cat 2326, Wight in Hook Bot Misc III 84 t 21 *Æ minus*, A DC 1c 142 *Æ Malaspinae*, DC 1c 143 *Æ obovatum*, Blume Bijdr 693 *Æ corniculatum*, Blanco Fl Filip 79 Kurz in Journ As Soc Beng XLVI II 227 and For Fl III 114 Mez Monog Myrs 55, fig 8 *Rhizophora corniculata*, Linn Sp Pl Ed 3 (1761), 635 "*Pou Kandel*, Rheede Hort Mal VI 36 *Manum fruticosum corniculatum* Rumph Herb Amb III 117

PRANG Wallich 2326, Curtis 52, 513 PERAK King's Collector 4961 MALACCA Mangay (K D) 1017, Griffith (K D) 3538 SINGAPORE Ridley 2401A 3632A —DISTRIB Sea coast of India from Sind to Ceylon the Sunda Islands, Burma, and the Andaman Islands, eastwards to the Malay Islands, South China, the Philippines and Australia. One of the coast plants included under the general name of Mangroves

## Order LXXI SAPOTACEÆ

Trees or shrubs, with milky juice, generally evergreen, young parts often rusty tomentose. Leaves alternate, rarely sub opposite coriaceous or rarely membranous entire, penninerved, stipules none or very caducous. Flowers usually hermaphrodite, small or medium sized, solitary or fascicled in the axils of the leaves, sometimes (*Sarcosperma*) paniculate bracts and bracteoles very small or wanting. Calyx inferior persistent or deciduous, lobes 4 to 8, much imbricate, occasionally biseriate with the outer ones valvate. Corolla gamopetalous tube short, campanulate or urceolate lobes as many as, or 2 to 4 times as many as, those of the calyx. Stamens inserted on the corolla tube in 1 to 2 series and opposite to them, sometimes alternating with staminodes, filaments short, erect, anthers ovate lanceolate or linear sagittate, 2 celled, the connective sometimes produced. Disk hypogynous, often inconspicuous or wanting. Ovary superior, sessile, often villous, 2-5- or more celled, style shortly conical or elongate subulate, glabrous, stigma terminal, punctiform, ovules solitary in the cells, attached to the inner angle. Fruit an indehiscent, 1-8 seeded berry, pericarp usually fleshy. Seeds, if solitary, conform to

the fruit; if more than one compressed, ellipsoid; hilum conspicuous; testa usually crustaceous, shining; embryo straight, exalbuminous with fleshy cotyledons, or albuminous with flat cotyledons; radicle inferior, usually small.—**DISTRIB.** About 320 species, in the tropical regions of the whole world, genera about 24.

**Calyx-lobes 1-seriate, imbricate; stamens 5 to 6:—**

Staminodes none .. .. . 1. *CHRYSOPHYLLUM*.

Staminodes present —

Flowers sessile or in panicles .. .. . 2. *SARCOSPERMA*.

Flowers in axillary fascicles .. .. . 3. *SIDEROXYLON*.

**Calyx-lobes 2-seriate, outer series valvate —**

Calyx segments 4.—

Seeds albuminous.—

Stamens 8 .. .. . 4. *ISONANDRA*.

Stamens 12 or more .. .. . 5. *PAYFNA*.

Seeds exalbuminous, stamens 12 or more .. .. . 6. *BASSIA*.

Calyx segments 6 to 8.—

Staminodes none, seeds exalbuminous .. .. . 7. *PALAQUTUM*.

Staminodes present, seeds albuminous .. .. . 8. *MIMUSOPS*.

### 1. *CHRYSOPHYLLUM*, Linn.

Trees with milky juice. *Leaves* coriaceous, glabrous or pubescent on the under-surface, main-nerves usually very many, thin; stipules none. *Flowers* small, in axillary fascicles, usually hermaphrodite. *Calyx* 5-7-lobed; lobes subequal, imbricate. *Corolla* tubular-campanulate or sub-rotate, 5-7-lobed; lobes imbricate, entire. *Stamens* equal in number with, and opposite to, the corolla-lobes, attached to the tube or the base of the lobes; filaments subulate or filiform, anthers ovate or triangular, extrorse or laterally dehiscent; staminodes none. *Ovary* villous, 5-, rarely 6-7-celled, style glabrous; ovules one in each cell, attached to the central placenta. *Fruit* a fleshy or coriaceous berry, globose, 5-celled or less by abortion. *Seeds* large; testa very hard, dull or shining; hilum conspicuous; embryo as large as the seed, erect, cotyledons flat in fleshy albumen, radicle inferior.—**DISTRIB.** About 60 species, chiefly tropical American, a few only in Asia, Africa and Australia.

*CHRYSOPHYLLUM ROXBURGHII*, G. Don Gen. Syst. IV. 33 (1837). A slender, erect tree reaching 40 to 60 ft. in height, evergreen; branches horizontal; bark smooth, grey; young branchlets and innovations ferruginous-pubescent. *Leaves* coriaceous, glabrous, alternate; oblong-lanceolate, suddenly caudate-acuminate at the apex which is sometimes obtuse, cuneate at base and unequal, undulate on the margins; 3 to 6 in. long, 1.25-2 in. broad; midrib slender, prominent

beneath, main-nerves very numerous, parallel, nearly at right angles to midrib, meeting in an intramarginal nerve, secondary nerves similar, reticulations slanting, petiole thick, 25 in long, pubescent. *Flowers* small, in rounded axillary fascicles, pedicels slender, 1 to 2 in long, ferruginous pubescent. *Calyx* lobes 5, ovate, glabrous or pubescent outside, thick, ciliate on the margins, 0.7 to 1 in long, tube short. *Corolla* tubular-campanulate, 1 in long, lobes 5, short, ciliate on the margins. *Stamens* 5, shorter than the corolla, opposite the corolla-lobes and inserted on the base of the tube, filaments slender, anthers ovate, apiculate and ending in a minute tuft of hairs, extrorse, slits somewhat lateral. *Ovary* rounded, obscurely 5-lobed, surrounded by a thick tuft of long ferruginous hairs, style thick, cylindric conical, glabrous, cells 5. *Fruit* a globose or obscurely 5-lobed berry 1 to 1.5 in diam strongly 5-lobed when dry, ferruginous tomentose when young afterwards smooth, yellowish green, with thick glutinous pulp. *Seeds* 6 in long, 5 in broad, flattened, the outer edge curved, the inner nearly straight, hilum oblong, conspicuous, pale, testa very hard, thick, shining, chestnut-brown, embryo erect, cotyledons flat, 4 in broad, ovate, obtuse, 3-nerved, radicle large, cylindric. A DC Prod VIII 162, Clarke in Hook f Fl Br Ind III 535, Bedd Fl Sylv t 236, Kurz For Fl II 118 and in Journ As. Soc Beng XLVI n (1877) 228, Trimen Fl Ceyl III 76, Dalz & Gibs Bomb Fl 138, Cooke Bomb Fl II 88, Burck Ann Gard Buit V 1 (1886), 4, Koord & Val Bijdr I 130. *C. acuminatum*, Roxb Fl Ind I 599, Wall Cat 4160 (not of Lamk). *C. lanceolatum*, A DC lc, Miq Fl Ind Bat II 1035. *C. javanicum*, Steud Nom Ed II 1 359. *Nycterstition lanceolatum*, Bl Bijdr 676.

MAIACCA Griffith (K D) 3600, Mangay (K D) 980, Goodenough 1739 SINGAPORE Ridley 2756, 5837 —DISTRIB British India, Burma, Java, Sumatra.

(*urtia* No 1072, collected at Batu Feringy, Penang and now in the Kew Herbarium, seems to be a new species of *Chrysophyllum*. The leaves are chartaceous, lanceolate acuminate at both ends, glabrous shining, 2 to 4 in long 75 to 1 in broad, the veins indistinct. *Flowers* unknown. *Fruit* a fleshy berry, 5 in diam, 5-lobed when dry, glabrous. *Seeds* 4 in long, 2.5 in broad, rounded on the outside narrowed and somewhat concave within, testa hard, dark chestnut brown shining, hilum narrow. It might be called *C. (urtia) n. sp.*, King & Gamble.

## 2 SARCOSPERMA, Hook f

Glabrous trees. *Leaves* coriaceous or chartaceous, opposite and alternate, oblong, stipules caducous. *Flowers* small, sessile or fascicled

on the branches of a simple or compound panicle, sessile or shortly pedicellate; bracteoles minute. *Calyx-lobes* 5, rounded, sub-equal, much imbricate. *Corolla* broadly campanulate; tube short; lobes 5, rounded, entire, much imbricate. *Stamens* 5, inserted on the tube of the corolla and opposite to its lobes; filaments very short; anthers obtuse, laterally or extrorsely dehiscent. *Staminodes* 5, small, subulate or rounded. *Ovary* glabrous, 1-2-celled; style short; stigma somewhat lobed, capitate. *Fruit* an ellipsoid berry, 1-2-seeded; pericarp coriaceous, scarcely thick. *Seeds* 1-2, testa crustaceous; hilum nearly basal; albumen none; embryo fleshy.—*DISTRIB.* Species 3, in North-East India, Burma, Malaya and S. China.

*SARCOSPERMA PANICULATUM*, Stapf & King in Hook. f. Ic. Plant. t. 2690 (1901). A tree, reaching 50 to 70 feet in height and 18 to 20 in. in diam.; branchlets thick, dark brown, glabrous. *Leaves* chartaceous; sub-opposite, elliptic-oblong, bluntly acuminate at apex, acute or rounded or often rhomboid at base; glabrous on both surfaces, nearly black when dry; 4 to 8·5 in. long, 1·5 to 3 in. broad; midrib slender; main-nerves 7-8 pairs, slender, distant, often nearly 1 in. apart, starting at an angle of about 60° with the midrib and at once curving upwards to and along the margin; secondary nerves many and, like the transverse reticulations, inconspicuous, glandular pits in the axils of most of the main-nerves, petiole ·5 to ·7 in. long, channelled above and with two minute rounded auricles below the blade. *Flowers* solitary or clustered on the branches of a leafy compound panicle of racemes, the racemes often 2 in. long; bracteoles minute, triangular; pedicels rarely reaching ·05 in. in length, stout; buds globose. *Calyx-lobes* 5, imbricate, rounded, usually 3 larger with somewhat scarious margins, 2 smaller thicker and slightly acute, shortly campanulate. *Corolla-lobes* 5, closely imbricate, rounded, glabrous, ·05 in. long, the margins revolute; tube as long as lobes. *Stamens* 5, inserted on the top of the tube; filaments very short; anthers ovate, rounded, introrse, or laterally dehiscent. *Staminodes* alternating with the stamens, minute, nearly orbicular, crenulate. *Ovary* conical, furrowed; style very short, thick, stigma capitate, minutely 2-4-lobed. *Fruit* drupaceous, ellipsoid, seeds, 1-2. *Bracca paniculata*, King in Journ. As. Soc. Beng. LXIV. ii. 101.

PERAK *Scortechini*; *King's Collector* 7970, 8086, 10284, 10554, 10672, 10835; among large bamboos, on river-banks, or in mixed forest.

### 3. *SIDEROXYLON*, Linn.

Trees or shrubs, sometimes armed, with milky juice. *Leaves* coriaceous or thinner, entire, alternate; stipules none. *Flowers*

small, in fascicles in the axils of the leaves or of the scars of fallen leaves, sub-sessile or shortly pedicelled. *Calyx* of 5-6 imbricate, usually orbicular and obtuse segments. *Corolla* campanulate, or tubular-campanulate, with 5 or rarely 6 lobes, the lobes imbricate. *Stamens* as many as the corolla lobes and opposite to them, attached to the tube or at its base, filaments linear, usually short, anthers ovate or lanceolate, staminodes alternating with the stamens, lanceolate. *Ovary* usually villous, with 5 or fewer cells, style cylindric, stigma small, ovules erect, placenta axile. *Fruit* an ovoid or globose fleshy berry, 5 or less seeded, usually with one seed only. *Seed* compressed, generally solitary, testa hard, crustaceous, usually shining, hilum oblong or linear, embryo erect, cotyledons flat or thickened, in fleshy albumen, radicle short, inferior. — **DISTRIBUTION** About 60 species, mostly of tropical regions in both hemispheres, a few only extratropical in South Africa or Australasia.

- Leaves more than 3 in. broad, yellowish when dry, main nerves very prominent . . . . . 1 *S. malaccense*  
 Leaves under 3 in. broad, green or brown when dry —  
     Leaves nearly glabrous, membranous, obovate acuminate . . . . . 2 *S. Manqay*  
     Leaves pubescent beneath, at least on the nerves  
         Corolla tube longer than the lobes, leaves elliptic, grey silky beneath . . . . . 3 *S. Desryanum*  
         Corolla tube shorter than the lobes —  
             Leaves obovate, main nerves not very prominent or regular . . . . . 4 *S. ferrugineum*  
             Leaves oblong lanceolate, main nerves very prominent and regular . . . . . 5 *S. firmum*

SPECIES IMPERFECTLY KNOWN 6 *S. Hallianum*

1 **SIDEROXYLON MALACCENSE**, Clarke in Hook. f. Br. Ind. III 537 (1882). A large tree reaching 40 to 60 feet in height, branches pale brown, ultimate branchlets ferruginous pubescent, as are the leaf buds and young leaves. *Leaves* coriaceous, often, not always, crowded towards the ends of the branchlets, obovate oblong, rounded or shortly acute at apex, somewhat cuneate at base, deep green above, pale bluish green beneath, yellow when dry, densely rusty pubescent beneath when young, glabrous on both surfaces when old except for rusty hairs on the midrib and main nerves beneath, 6 to 8 in. long, 3 to 4.5 in. broad, midrib very thick and prominent, main nerves 8-14 pairs, very prominent, starting at about an angle of 60° with the midrib, parallel at first, ultimately arched upwards, reticulations not prominent, obliquely joining the main nerves, petiole 1 to 1.5 in. long, thick, enlarged at base, bordered above by the slightly decurrent margins of the blade. *Flowers* fasciculate, shortly pedicelled, in the axils of the leaves, above

the scars of fallen leaves or on the year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, rusty-tomentose. *Calyx-lobes* 5, imbricate, .15 to .2 in. long, densely rusty-pubescent without, rounded. *Corolla* tubular-campanulate, .15 in. long, absent in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* attached to the base of the corolla-tube; anthers ovate, apiculate, opening by side-slits; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top, obscurely 5-lobed, 5-celled; style cylindric. *Berry* fleshy, somewhat oblong, rounded, tipped with the persistent style, thickly covered with velvety orange-red tomentum and about .5 in. in diam. *Seeds* not accurately known.

PENANG: *Curtis* 1452. PERAK: *Wray* 136; *King's Collector* 6550. MALACCA: *Maingay* (K D.) 994; *Holmberg* 704. SINGAPORE: *Ridley* 6130, 6499; *Cantley* 89.

Mr. Cantley says that this tree gives the true "Daru-daru" or "Dedaru" wood of the Malay Peninsula.

2. *SIDEROXYLON MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 536 (1882). A tree with rusty-pubescent branchlets and young shoots. *Leaves* membranous, crowded towards the ends of the branchlets; obovate, shortly acuminate at apex, cuneate at base, rusty-pubescent when young, glabrous when old or rusty-pubescent on the midrib and main-nerves, 4 to 8 in. long, 1.5 to 3 in. broad, midrib prominent, main-nerves 8 to 11 pairs, starting at an angle of nearly 60° to the midrib, at first parallel then arching upwards to near the margin, transverse reticulations more or less parallel; petiole 1 to 1.5 in. long, bordered by the decurrent margins of the blade. *Flowers* fasciculate, sessile or with very short pedicels, chiefly on the previous year's wood below the leaves and shoots of the year. *Calyx-lobes* 5, imbricate, rounded, rusty-pubescent without, .075 to .1 in. in diam. *Corolla* tubular-campanulate, as long as or rather shorter than the calyx, wanting in ♀ flowers, lobes very short, obtuse, imbricate. *Stamens* short; filaments slender; anthers ovate, staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top, style cylindric. *Berry* fleshy, 1.5 in. in diam., ovoid or globular, full of guttapercha. *Seeds* 4, compressed, .7 in. long by 3 to .35 in. broad; rounded outside, nearly straight within, the long narrow oblong hilum covering nearly the whole margin, testa hard, shining, dark chestnut-brown; albumen firm, white; cotyledons plane, appressed, elliptic; radicle inferior.

NEGI SEMBILAN: *Ridley* 10084. MALACCA: *Maingay* (K.D.) 993; *Hervey*. SINGAPORE: *Ridley* 8928, 9223. •

The fruit description is chiefly taken from Maingay's notes in the Kew Herbarium.

3 *SIDEROXYLON DERBYANUM*, King & Gamble, n. sp. A tree, branchlets grey, uppermost appressed pubescent, innovations with nearly black hairs. *Leaves* chartaceous, elliptic, very abruptly short acuminate at apex, broadly cuneate at base, margins more or less recurved, glabrous above, densely silvery-pubescent beneath, 3 to 5.5 in long, 1.5 to 3 in broad, midrib prominent, impressed above, main nerves 12 to 18 pairs, parallel, starting at an angle of about  $75^{\circ}$  with the midrib, meeting near the margin in a faint intramarginal looped nerve, secondary nerves similar, rather prominent, reticulations few, obscure, petiole 3 to 5 in long, channelled above, pubescent with nearly black hairs. *Flowers* fascicled, about 5 together in the axils of the leaves or of the scars of fallen leaves, pedicels 2.5 in long, tawny-pubescent, buds oblong, conical. *Calyx lobes* 5, rounded, obtuse, the 2 outer thick very pubescent, the 3 inner somewhat scarious, pubescent only on the middle of the back. *Corolla* campanulate, 2 in long, tube 1.5 in long, glabrous within, with a few sparse hairs without, lobes 5, ovate imbricate, margins recurved. *Stamens* 5, short, inserted at the top of the tube, filaments conical, anthers ovate-cordate, dehiscing by side slits, staminodes subulate, glabrous. *Ovary* villous, obscurely 5 lobed, 5 celled, style very short, stigma obscurely 5 lobed. *Berry* oblong, dark blue, glabrous, the top flat and crowned with the remains of the style, 6-7 in long, 1 seeded. *Seed* oblong, 6 in long by 3 in in diam truncate obliquely at the base, testa thick light brown, striate, hilum rather small, sub basal, albumen thin cotyledons thick, radicle small.

PERAK *Dirry-Curtis* 3641

The colour of the silvery under surface of the leaves is difficult to describe—it is sometimes dark and smoky looking.

4 *SIDEROXYLON FERRUGINEUM*, Hook & Arn Bot Beech Voy 266, t 55 (1841). A small tree, branches rough, ultimate branchlets ferruginous pubescent like the leaf buds and young leaves, branchlets with a raised line downwards from each leaf or scar of a fallen leaf. *Leaves* coriaceous, obovate or oblong lanceolate, rounded or bluntly acute at apex, attenuate at base, shining above, densely appressed ferruginous-silky beneath when young, ultimately nearly glabrous, 2.5 to 6 in long, 1 to 3 in broad, midrib prominent, main-nerves 10 to 12 pairs, fairly prominent, especially above, starting at about an angle of  $60^{\circ}$  with the midrib, at first nearly parallel then arching upwards to meet near the margin, secondary nerves similar, reticulations oblique, petiole 5 to 7 in long, the edges bordered by the decurrent margins of the blade, enlarged at base. *Flowers* fasciculate, shortly pedicelled, in the axils of



the leaves or above the scars of fallen leaves on year-old wood below the leaves and shoots of the year, pedicels 1 to 2 in long, covered like the obtuse buds with rusty tomentum *Calyx* lobes round, 0.25 to 0.75 in in diam, with scarious margins, closely imbricate, rusty-pubescent outside *Corolla* campanulate, 1 in long, tube short, lobes 5, imbricate, rounded, crenulate, sparingly pubescent near the base within, in ♀ flowers wanting or deciduous *Stamens* very short, attached to the corolla-tube above the base, filaments linear, anthers rounded, opening by marginal slits, staminodes subulate or somewhat hastate, acuminate *Ovary* depressed, obscurely 5 lobed, pubescent, stigma short, cylindric, with 5 minute punctiform styles *Berry* ovoid, shining 3.5 by 3 in, 1-2-seeded *Seeds* ovoid, 2.5 by 1.5 in, testa shining, dark brown, thick, hilum large, oblong, albumen thick, cotyledons flat A DC Prod VIII 178, Clarke in Hook fil Fl Br Ind III 537 *S. attenuatum*, A DC lc, Wight Ic t 1590, Kurz For Fl II 117, and in Journ As Soc Beng XLVI n (1877) 229 *Mimusops? attenuata*, Wall Cat 4150

KEDAH Langkawi, Curtis PENANG Curtis 273, 703, 704 PRAK *Scortechini* 1463, King's Collector 1224 MALACCA Maingay (K D) 982, Griffith (K D) 3604, Goodenough 1735 SINGAPORE Wallach 4150, Lobb 319, Ridley 5643, 5908 A sea shore tree, found also by Ridley on Tioman Island and at Kuala Pahang (Trans Linn Soc Ser 2 III 317)—DISTRIB Burma, Andaman Islands, Nicobar Islands, Malay Archipelago to the Philippines and S China

5 SIDI ROXYLON ILMUM, Pierre, Burck in Ann Jaid Buit V 17, tab III. (1885). A small tree, branchlets thick, striate, brown, innovations ferruginous pubescent *Leaves* coriaceous, oblong-lanceolate, shortly acuminate at apex, narrowly acute at base, glabrous above, rusty-pubescent on the nerves beneath and on young leaves, margins recurved, 4 to 5 in long, 1 to 1.5 in broad, midrib strong, prominent, impressed above, main nerves 12 to 16 pairs, very prominent, about 2 to 3 in apart, starting at an angle of about 40° with the midrib, parallel, curved near and along the margin, reticulations transverse, very regular and prominent, petiole 1 to 1.5 in long, channelled above and bordered by the decurrent margins of the blade, rusty-pubescent *Flowers* fascioled, 4 to 6 together in the axils of the leaves, pedicels variable, 3 to 6 in long, rusty-pubescent, slender in flower, thickened in fruit *Calyx*-lobes 5, rounded, imbricate, 1.5 in long, densely rusty-pubescent, 3 outer thick, 2 inner more or less scarious on the margins *Corolla* campanulate, 1.5 in long, 5-lobed, glabrous within, slightly hairy without, tube rather short, lobes oblong, rounded. *Stamens* inserted on the top of the tube, filaments glabrous, anthers ovate-apiculate,

staminodes subulate, about 05 in long Ovary villous, style clavate, glabrous Fruit an oblong or somewhat obovoid berry, depressed at apex, glabrous, fleshy, supported by the somewhat enlarged persistent calyx-lobes, seed usually 1 Seed oblong, obtuse above, somewhat pointed below, little compressed, 6 in long, 25 in broad and thick, testa chestnut brown, shining, crustaceous, hilum linear, flat, occupying nearly the whole inner face of the seed, albumen thick, cotyledons leafy, flat, oblong, 3-nerved, radicle inferior, pointed *Chrysophyllum firmum*, Miq Fl Ind Bat Suppl 579

PENANG at West Hill, *Curtis*, 1575.—DISTRIB Bangka, *Teysmann*, Philippines

The Bangka specimens have the leaves up to 25 in broad, but in other respects we find no difference from *Teysmann's* type in the Penang plant

#### SPECIES IMPERFECTLY KNOWN

6 SIDERXYLON WALLICHIANUM, G Don Gen Syst IV 28 (1837) A tree (?), branchlets pale brown, ferruginous-villous as are the innovations Leaves chartaceous, elliptic obovate, obliquely acuminate at apex, cuneate at base, crowded towards the ends of the branchlets, 6 to 8 in long, 3 to 4 in broad, midrib thick, main-nerves 6 to 7 pairs, curved upwards, distant, reticulations prominent, petiole thick, densely tawny-pubescent Calyx lobes apparently 5, short, rounded, rusty pubescent Miq Fl Ind Bat II 1037 S (?) rugosum, Wall Cat 4158

The only sheet of this is in the type Herbarium of Wallich's plants with the Linnean Society of London The remains of flowers are very slight but they seem to show that the plant belongs to this genus The note a small plant growing on rocks—flowers white—from the hills' attached to the sheet seems to refer to some other plant, for the specimen itself has every appearance of having come from a tree

#### 4 ISONANDRA, Wight

Trees with milky juice Leaves coriaceous, entire, alternate, penniveined, the main nerves and midrib prominent, the rest usually rather obscure Flowers small, in axillary shortly pedicellate clusters in the axils of present or fallen leaves Calyx of 4 segments, the two outer opposite, more or less valvate, the two inner also opposite, imbricate Corolla tubular, campanulate, lobes 4, much imbricate, somewhat twisted Stamens 8, sub-equal, attached near the base of the corolla, both opposite to and alternate with the lobes filaments short, anthers lanceolate, sagittate at base, extrorse, staminodes absent Ovary 4 celled, villous, style linear Berry somewhat small, ovoid or oblong with a fleshy pericarp Seed usually 1 only, scarcely flattened, testa thick, shining, crustaceous, hilum

lateral, long; albumen fleshy, cotyledons flat, radicle inferior.—DISTRIB. About 7 species, 6 of which in South India and Ceylon.

1. *ISONANDRA PERAKENSIS*, King & Gamble, n. sp. A small tree reaching 30 to 40 feet in height; ultimate branchlets, leaf-buds and young leaves appressed greyish-brown-pubescent. *Leaves* coriaceous; obovate-oblong, rounded at the apex, cuneate sometimes unequally at the base; the margins reflexed, glabrous and dull above, thickly brown-pubescent beneath; 2 to 3.5 in. long, 1 to 1.5 in. broad; midrib prominent; main-nerves 8 to 10 pairs at about 60° with the midrib, reticulations very inconspicuous, petiole .2 to .3 in. long, rather stout. *Flowers* fasciculate, on very short, .1 in. long, thick, angular pedicels in the axils of upper leaves; buds .15 in. long, obtuse, brown-appressed-pubescent. *Calyx* of 4 lobes, an outer pair and an inner pair, the outer valvate, the inner shining within, minutely ciliate, lobes .15 in. long. *Corolla* 4-lobed, lobes rounded, about equal to the tube, together about equal to the calyx. *Stamens* 8, filaments thickened, anthers lanceolate, sagittate at base, extrorse. *Ovary* slightly hairy, conical, surmounted by a short linear style as long as the calyx; cells 4. *Berry* oblong, acute, smooth, 4 to 5 in. long. *Seeds* ellipsoid, acute at apex, scarcely flattened, .35 by .15 in.; hilum large, oblong; testa dark brown, hard, smooth, shining; albumen fleshy; embryo large, cotyledons oblong.

PERAK at 1,000 to 1,500 feet elevation, King's Collector 7138.

#### DOUBTFUL SPECIES.

2 *ISONANDRA RUFA*, King & Gamble, n. sp. A small tree, reaching 20 to 30 feet in height and 4 to 6 in. in diam., younger branchlets and innovations densely ferruginous pubescent. *Leaves* membranous, obovate, long acuminate sometimes abruptly at apex, cuneate and finally more or less rounded at base; sparsely pubescent above when young, nearly glabrous when old; roughly pubescent beneath, especially on the nerves, 5 to 7 in. long, 1.5 to 2.5 in. broad, midrib prominent; main-nerves 8 to 10 pairs, irregularly distanced, at first at an angle of about 45° with the midrib, then arching upwards, secondary nerves and reticulations prominent; petiole .3 in. long, slender, rusty-pubescent, channelled above, stipules very short, subulate, rusty-pubescent, very caducous. *Flowers* solitary or in pairs in the axils of the upper leaves or on the upper branchlets, very small, pedicels slender, .25 in. long, recurved. *Calyx-lobes* 4, densely ferruginous-pubescent; 2 outer valvate, ovate, .2 in. long; 2 inner imbricate, ovate, somewhat scarious and ciliate on the margins. *Corolla* tubular-campanulate; .2 to .25 in. long; tube slender, minutely

hairy without and near the mouth within, lobes 6 (?), linear oblong, 1 in. long, erect *Stamens* 6 (?), 1 in long, filaments very slender, villous, anthers ovate, penicillate-apiculate *Ovary* rounded, glabrous, style slender, curved, 2 in long. *Fruit* an oblong berry, about 1 in long and .5 in. broad *Seed* 1, testa thin, shining

PERAK *Scortechium* 159, *Kings Collector* 4550, in dense jungle at 500 to 800 feet.

In only one flower were any traces found of the corolla and stamens, and there seemed to be 6 corolla lobes instead of 4, and 6 stamens instead of 8. We consider it best, however, to leave the species here for the present and until better material is available

## 5 PAYENA, A DC

Trees with milky juice *Leaves* membranous or chartaceous, often silky beneath, stipules caducous *Flowers* fascicled, rather few together, in the axils of the leaves on the upper part of the branchlets, pedicellate *Calyx* lobes 4, the 2 outer usually valvate enclosing the 2 inner generally imbricate *Corolla* campanulate, tube broad, short, lobes 8, imbricate, in one or two series *Stamens* 16, inserted on the corolla tube, filaments short, anthers usually extrorse, ovate to linear, connective produced in an acumen, staminodes none *Ovary* villous, usually 8-celled, style linear subulate *Fruit* an oblong or ovoid fleshy berry, few-seeded *Seeds* oblong, usually somewhat compressed testa crustaceous, shining, hilum oblong or linear, conspicuous, albumen thin, cotyledons leafy, thin, flat, nearly as long and broad as the cavity of the seed, radicle inferior, generally rather conspicuous — *DISTRIB* About 6 to 7 species, found in the Malay Peninsula and Archipelago

Flowers large, reaching 75 in in length —

Leaves 6 to 9 in long, silky pubescent beneath . . . 1 *P. Mangayi*

Leaves 4 to 5 in long, glabrous on both surfaces . . . 2 *P. longipedicellata*

Flowers medium sized or small, under 75 in in length —

Flowers in fascicles near the ends of the branchlets, having the appearance of a terminal inflorescence —

Flowers moderate sized, berry obpyriform, acuminate at tip . . . 3 *P. Havilandi*

Flowers small, berry oblong conical, truncate at tip . . . 4 *P. Laceri*

Flowers in fascicles in the axils of the leaves, never apparently terminal —

Leaves glabrous, pedicels slender, flowers small . . . 5 *P. lucida*

Leaves ferruginous pubescent, pedicels short, flowers rather large . . . 6 *P. dasyphylla*

## SPECIES IMPERFECTLY KNOWN

Leaves sessile . . . . . 7 *P. sessilis*

Leaves petiolate —

Leaves under 4 in long, obovate or elliptic obovate, more or less obtuse .. .

8 *P. obtusifolia*

Leaves over 4 in long, oblong-lanceolate, acuminate

9 *P. selangorica*

1 *PAYENA MAINGAYI*, Clarke in Hook f Fl Br Ind III 547 (1882)  
A large guttapercha yielding tree, reaching 80 feet in height and a considerable girth, branchlets dark brown, smooth, younger branchlets and innovations rusty-tomentose, leaf buds golden pubescent, scales 2 to 3 in long, lanceolate. *Leaves* chartaceous, oblong, acuminate at the apex sometimes caudately sometimes abruptly, cuneate at the base, glabrous above except on the midrib, covered beneath with a silky golden-brown pubescence, afterwards glabrate, 6 to 9 in long, 2 to 3 in broad, midrib prominent, minutely pubescent above or glabrous, main-nerves 20 to 25 pairs, 3 to 5 in apart, starting at an angle of about 70° with the midrib, at first parallel, ultimately ending in a looped intramarginal nerve, secondary nerves between the main nerves, obscure like the reticulations, petiole 1 in long, bordered above by the decurrent margins of the blade, stipules linear, subulate, 3 in long, golden-pubescent, quickly caducous. *Flowers* fascicled, 2 to 6 together in the axils of the leaves, pedicels slender, 75 in long, up to 1 in in fruit and then thickened, clavate, brown-pubescent. *Calyx* lobes 4, 4 to 5 in long, densely brown pubescent outside, outer pair valvate, ovate-acute, thick, inner pair imbricate, concave, keeled, acuminate, rather thin. *Corolla* white, campanulate, 6 to 8 in long, glabrous, tube about 2 in long, lobes 8, lanceolate, in 2 rows, the outer 4 enclosing the inner 4. *Stamens* 16, inserted on the top of the tube, 25 in long, filaments thick, anthers as long as filaments, ovate, extrorse, crowned by a long mucro formed by the produced connective, the mucro ciliate or truncate or bifid at the apex. *Ovary* ovoid, pubescent, tapering into a subulate 8 in long style, cells 8. *Fruit* an oblong, golden-pubescent or nearly glabrous berry up to 15 in long by 8 in broad, crowned by the remains of the persistent style, and supported by the persistent calyx lobes, seeds 1 to 2. *Seeds* oblong, convex on one side, somewhat concave on the other, 1 to 2 in long by 5 in broad and 2 in thick, testa light brown, shining, crustaceous, hilum conspicuous, slender, albumen thin, cotyledons oblong rounded, 8 in long by 225 in broad, radicle rather large, inferior. *Pierre* in Bull Linn Soc Par I 526. *Chrysophyllum* ? *molle*, Wall Cat 4161

PENANG *Curtis* 1565 PFRANK *Scortechini* 172, 346, *Wray* 3423, *King's Collector* 7223, 7918, in open jungle or rich soil from 300 up to 2,000 feet MALACCA *Griffith* (K D) 3610, *Maingay* (K D)

990, *Curtis* 3483 SINGAPORE *Ridley* 6239, 6497 *Curtis* says it is the "Taban Percha" of the Malays

The drawing of the flower in Engl & Prantl *Naturl Pflanzen Fam* IV : 132, fig 69 A-C seems a little doubtful The identification of Wall Cat 4161 seems also doubtful, for *Payena Mamqay* much resembles in leaf *Pala jorum Guttu var oblongifolia*

2 *PAYENA LONGIPEDICELLATA*, Bracc MS in Herb Calc A tree, reaching 100 to 130 feet in height, branches slender, silvery-grey, innovations rusty pubescent *Leaves* chartaceo-coriaceous, oblong or elliptic oblong, shortly acuminate at apex, rounded unequally at the base, glabrous on both surfaces, margins slightly recurved, 4 to 5 in long, 1.5 to 2 in broad, midrib slender, impressed above, main-nerves about 18 pairs, indistinct, starting at about 85° with the midrib, at first parallel, near the margin joined in an intramarginal looped nerve, secondary nerves nearly as prominent as main-nerves, often branching backwards, reticulations few, indistinct, petiole 7 to 8 in long, channelled above and bordered by the margins of the decurrent blade stipules small, ovate acute, rusty pubescent, very caducous *Flowers* fascicled, 1-3 together, in the axils of lower leaves or of the scars of fallen leaves, pedicels 1 to 1.5 in long, slender, curved, striate when dry, clavate above, puberulous, flower buds conical, large *Calyx* lobes 4, 2 outer valvate, ovate acute, thick, 5 in long, sparsely rusty pubescent, 2 inner lanceolate acuminate, concave, thickly keeled, 6 in long, densely tawny pubescent on the back *Corolla* tubular-campauulate, 8 in long, tube 3 in long, glabrous, lobes 8, 4 outer enclosing 4 inner, ovate acuminate, glabrous *Stamens* 16, inserted in 1 row, below the top of the tube but alternate ones covered by the others, filaments very short, slender, anthers 1.5 in long, ovate rusty hirsute, extrorse, the connective produced in a broad mucro divided in 2 diverging lobes at the tip *Ovary* oblong, style a little longer than the corolla-lobes *Fruit* not known

PERAK *King's Collector* 2940 — *DISTRIB* Borneo, *Haviland* 3035

3 *PAYENA HAVILANDI*, King & Gamble, n sp A large tree (?), branchlets grey, slender, innovations appressed rusty pubescent *Leaves* chartaceo coriaceous, elliptic, abruptly acuminate at apex, at tenuate usually unequally at base, glabrous above, glabrous beneath except on the midrib which is appressed-rusty-pubescent, margins recurved, 2.5 to 3 in long, 1.25 to 1.75 in broad, midrib slender, main-nerves 10 to 12 pairs, not very prominent, rather irregular, starting at about an angle of 60° with the midrib, meeting close to the margin in an intramarginal looped nerve, secondary nerves and reticulations scanty but prominent, raised beneath, petiole 4 to 5 in long,

channelled above and bordered by the decurrent margins of the blade, stipules small, ovate falcate, densely ferruginous pubescent *Flowers* fascicled, 3-4 together, in the axils of upper leaves or of terminal leafless branchlets, giving the appearance of a terminal corymbose inflorescence, pedicels 8 to 1 in long, densely rusty pubescent, recurved, buds ovate, 25 in long, obtuse *Calyx lobes* 4, outer pair rounded, thick, appressed pubescent to nearly glabrous, inner pair thinner, scarious, ciliate *Corolla* campanulate, 3 to 4 in long, longer than the calyx, glabrous, lobes 8, oblong, cordate at base, crenate or ciliate on the margins, veined, tube as long as lobes *Stamens* 16, usually in 2 rows, filaments slender, glabrous, anthers ovate, the connective broad and produced in a broad glabrous acumen, sharp in bud, flattened later on *Ovary* linear oblong, style slender, 5 in long *Fruit* an obpyriform fleshy berry, 15 in long and 75 in broad, surmounted by the persistent conical style, seed 1 *Seed* oblong, 1 in long, 6 in broad flattened, testa crustaceous, shining, chestnut brown, hilum narrow, elongated, albumen thick cotyledons broadly oblong, 5 in long, nerved, radicle rather large, nearly 15 in long

KFDAH Lankawi Island *Ridley* 8329 PFNANG *Curtis* 777  
SINGAPORE *Ridley* 4959, 9203 — DISTRIB Borneo, *Haviland* 2098, 2320

P CROIXIANA, *Pierre* in *Bull Soc Linn Par I* 524 seems to be this species or very near it The following is *Pierre's* description —

A huge tree *Leaves* oval or sub oblong, long acuminate, glabrous, 2-3 in long, 3 in broad, main nerves 24 to 28 petiole 25 in *Flowers* 3, axillary, sub terminal, peduncles 2 to 3 in long, 6 in in fruit *Sepals* ovate, ciliate *Corolla tube* pubescent without, lobes oblong, truncate at the apex, ciliate, filaments very short, anthers sub oblong with a long connective, obtuse, pilose on both sides *Ovary* 8 celled, tomentose, urceolate at the base of the style *Berry* oblong, 8-12 in long, 5-6 in broad, glabrous, 1 seeded, pericarp 06 in thick, hilum under 04 in broad, laterally extended over the whole height cotyledons 8 in long, 02 in broad, radicle 14 in long

MAIACCA St Pol Lias, Mad Eirington de la Croix in *Paris Mus "Sundek"*

4 PAYENA LLERII, *Benth & Hook f*, *Pierre* in *Bull Soc Linn Par I* 524 (1885) A tree, reaching 80 to 100 feet in height and a considerable girth, branchlets grey slender, innovations minutely rusty-pubescent *Leaves* chartaceous, elliptic, abruptly acuminate at apex, acute or somewhat rounded at base, upper surface glabrous, shining, lower surface sparsely pubescent to glabrous, margins undulate, recurved, 2 to 4 in long, 1 to 2 in broad, midrib prominent, impressed

above, main-nerves 14 to 18 pairs, slender, about 2 in apart, inconspicuous, more or less parallel, starting at an angle of about  $80^{\circ}$  with the midrib, straight almost to the margin where they are connected by a looped intramarginal nerve, secondary nerves many, forking backwards, reticulations faint, petiole slender, 75 in long, channelled above by the decurrent margins of the blade, stipules short, subulate, pubescent, very caducous. *Flowers* fascicled, 3-4 together, in the axils of upper leaves or on terminal leafless branchlets, giving the impression of a terminal inflorescence, pedicels slender, 4 in long pubescent. *Calyx lobes* 4, 15 in long, the 2 outer ovate valvate, minutely pubescent the 2 inner ovate, truncate at apex, almost scarious on the margins, pubescent imbricate. *Corolla* campanulate tube 05 in long, glabrous, lobes 8 imbricate, the 4 rather smaller outer embracing the 4 larger inner, ovate obtuse, 15 in long. *Stamens* 16, inserted in one row on the top of the corolla tube, those opposite the lobes longer than and behind those alternate with them, filaments very short, hairy anthers ovate, 075 in long, extrorse, the connective produced in a rather thick penicillate mucio. *Ovary* villous, depressed, obscurely 8 lobed, style subulate, glabrous above, pubescent below, 2 in long, cells 8. *Fruit* an ovate oblong conical reddish green berry, 15 to 175 in long, obscurely ribbed and rough, at first tipped with the conical remains of the style afterwards truncate seed 1. *Seed* 1 in long, about 4 in broad, oblong, testa thin crustaceous, dark brown, hilum long, narrow, albumen thin, cotyledons oblong, 85 in long 35 in broad, faintly 3 nerved, radicle small, inferior. Kurz in Journ As Soc Beng XL (1871) II 69, Burck in Ann Jard Bot V (1885) 56, tab VIII, Engl and Prantl Pflanzenfam IV 1 133, fig 70. *Keratephorus Leeri*, Hassk Retzia I (1856) 101, Miq Fl Ind Bat II 1039. *Azola Leeri*, Teysm & Binnend in Nat Tijdschr Neerl Ind VI 116.

*PFRANK* Wray 1539, at 4,900 feet on Batang Padang, *Kings Collector* 523 SINGAPORE *Cantley* 20 —DISTRIB Sumatra, Bangk, Borneo (?), Amboina. *Vern* "Getah Sundek" It gives a second rate variety of guttapercha.

To this species probably belong *Ridley* 11913 *Curtis* 3641 and *David* 10857 all apparently from Sumatra—*Vern* 'Getah Sundi' The specimens have leaves only.

*Curtis* No 4640 "Getah Sundek" from the Dindings is either this species or *P. Haslundi* but the fruit is globose, not elongate or obconical. It seems however, to have been more or less attacked by insects and may not show its proper shape.

5 *PAYENA LUCIDA*, A DC Prod VIII 197(1844) An evergreen tree



reaching a height of 60 feet and considerable girth, branchlets slender, dark brown, innovations rusty-tomentose *Leaves* chartaceous, elliptic, elliptic-oblong or elliptic-lanceolate, obtusely and rather abruptly caudate-acuminate at apex, acute at base and unequal-sided, glabrous on both surfaces, the margins slightly recurved, 4 to 5 in long, 1.5 to 2 in. broad, midrib prominent, slender, main-nerves 10 to 12 pairs, not prominent, rather irregular, 3 to 4 in apart, starting at an angle of about 60° with the midrib, straight at first, arching near the margin to meet in a looped intramarginal nerve, secondary nerves and reticulations rather scanty, petiole 4 in long, channelled above, stipules very minute, linear, silky-pubescent, caducous *Flowers* fascicled, 1 to 4 together, in the axils of upper leaves, pedicels slender, 7 to 8 in long, somewhat clavate, minutely silky, buds conical, 1 to 2 in long *Calyx-lobes* 4, 2 outer valvate, thick, enclosing 2 inner, broad, ovate, obtuse, ciliate, often scarious on the margins, 2 in long *Corolla* white, campanulate, 2 to 3 in long, tube short, lobes 8, oblong, obtuse or rounded in 2 rows, 4 outer enclosing 4 inner *Stamens* 16, 12 in long, filaments short, thick, anthers ovate, the connective produced into an obtuse, glabrous, often bifid acumen, cells extrorse. *Ovary* villous, rounded, style subulate, glabrous, 3 in long, 6 celled *Fruit* an oblong, ferruginous pubescent berry, 1 to 1.5 in long, 7 in broad, 1-seeded *Seed* oblong, bluntly acute at both ends, flattened, 8 in long, 5 in broad, 3 in thick, testa chartaceous, chestnut-brown, shining, hilum about 1.5 in broad occupying the whole inner edge, albumen thick, cotyledons oblong, thin, flat, faintly nerved as the leaves, 6 in long, 4 in broad, radicle rather large, inferior Kurz For Fl II 121, Journ As Soc Beng XL n 69, and XLVI n 230, Clarke in Hook f Fl Br Ind III. 547, Pierre in Bull Soc Linn Par I 525 *Mimusops lucida*, Wall. Cat 4147, G Don Gen Syst IV 35 (not of Poir)

PENANG Wallach 4147 PERAK *Scortechium* 1989, Wray 2266, 3114, 3191, 3482, King's Collector 3364, 3734, 6636 SINGAPORE. Lobb 307, Ridley

VARIETY *Wightii*, Clarke in Hook f Fl Br Ind III 548 *Leaves* large, up to 6 in long and 2.5 broad, coriaceous, pedicels stout, sepals large, rusty-tomentose *Paysona polyandra*, Bth & Hook f, Pierre in Bull Linn Soc Par I 526 *Isonandra polyandra*, Wight Ic. t 1589 *Keratephorus Wightii*, Hassk in Retzia I 101

Of this variety Clarke makes two forms which he distinguishes chiefly by the former having short acuminations to the leaves, the latter long acuminate leaves. We have separated the material into these two groups as well as we can.

Form (1) Leaves up to 6 in long, 2.5 in broad, abruptly acuminate, shining

above, ferruginous red beneath when dry, flower buds ovoid, 2 in long or more, rusty pubescent. Pedicels stout, clavate, fruit oblong depressed at top, anther connective not so broad as in *P. lucida*.

MALACCA Griffith (K D) 8605 (part) Manjary (K D) 194 Hervey Derry 937 Holmberg 794, Goodenough 1977 PERAK King's Collector 8705

Form (2) Leaves up to 6 in long, oblong lanceolate, long acuminate, reddish beneath when dry, nerves more prominent than in *P. lucida*; pedicels slender, 8 to 12 in long, buds ovoid sometimes flattened, 2 to 3 in long rusty pubescent, young fruit oblong conical, tipped by the persistent style, old fruit oblong, over 1 in long *P. costata*, King MS in Herb Calc

MALACCA Griffith (K D) 3605 (part), Manjary (K D) 989, Goodenough 1853 Derry 664, Curtis 3644, 3660 PENANG Curtis 1516 PERAK King's Collector 3734 4081 7842 7957 10466 10496, 10978 PAHANG Ridley 2872 SINGAPORE Goodenough 10545 RIDLEY 3995 5070 6508, 11305

VAR *nigra*, King & Gamble Leaves much larger than in the specimens of true *P. lucida*, elliptic, long caudate acuminate at apex, more or less rounded at base, undulate on the margins, 6 to 8.5 in long, 2.5 to 4 in broad main nerves and intramarginal nerve very prominent, raised beneath, flower buds and pedicels often golden-pubescent. Flowers as in *P. lucida*

PERAK Wray 1170, Scottellani

*P. LOWIANA*, Pierre in Bull Soc Linn Par I 524, seems to be one of the varieties of *P. lucida* or a species allied to it. The following is Pierre's description —

A huge tree. Leaves with petiole 4 in long blade 5 in long, 12 to 16 in broad, oblong lanceolate, obtusely acuminate, glabrous, main veins 24, distant. Fruiting peduncles axillary, 1-1.2 in long, solitary. Berry oblong, 1.3 in long by .8 in broad, sub glabrous, crowned at the top with the remains of the style. Seed solitary, 1.1 in long, .35 in diam, erect, hilum lateral, .08 in broad, cotyledons oblong, attenuate at the apex, .8 in long by .2 in broad, radicle 1.5 in long *P. lucida* MS in Herb Mus Par

PERAK Sir Hugh Low, St Paul's No 272

6 PAYENA DASYPHYLLA, Pierre in Bull Soc Linn Par I 527 (1885) A large tree, reaching 80 to 100 feet in height and considerable girth, branches spreading, branchlets greyish brown, moderately thick, innovations densely ferruginous pubescent. Leaves membranous, oblong or elliptic oblong or obovate oblong, often unequal sided, acuminate at apex acute, cuneate or somewhat rounded at base, glabrous above except on the midrib and near the base, densely ferruginous pubescent beneath, when old nearly glabrous, 4 to 8 in long, 1.5 to 3 in broad, midrib thick, pubescent on both surfaces, main nerves 12 to 16 pairs, unequally spaced, starting at about 60 with the midrib, produced straight to meet a looped intramarginal nerve, secondary

nerves rather prominent, reticulations irregular, petiole 5 in. long, thick, densely rusty pubescent, channelled above, stipules subulate, rusty-pubescent, short, early caducous. *Flowers* fascicled, 1 to 3 together, in the axils of the leaves, pedicels thickly rusty pubescent, 4 to 6 in long, somewhat enlarged in fruit, buds ovoid. *Calyx-lobes* 4, 2 outer thick, valvate, 3 in long, triangular rounded, densely rusty-pubescent, 2 inner concave, slightly imbricate, 35 in long, thickly keeled, scarious on the margins and ciliate, rusty-pubescent around the keel. *Corolla* tubular-campanulate, 3 in long, tube 1 in long, glabrous, lobes 8, the 4 outer enclosing the 4 inner but inserted in one row, oblong, obtuse. *Stamens* 16, 175 in long, inserted on the top of the tube, filaments 05 in long, villous, anthers nearly linear, extrorse, the connective produced in a 05 in long, blunt or even bifid acumen. *Ovary* conical, villous as is the base of the 35 in long subulate style. *Fruit* an ovoid densely tawny pubescent berry 75 to 1 in long, umbonate at the tip and crowned with a portion of the style. *Seeds* 4 to 5 in long, elliptic acute, testa dark brown, shining, hilum narrow, albumen thin. BUREK in ANN JAID BUIT V 51. *Isonandra dusyphylla*, MIQ Pl Jungh 201 and Fl Ind Bat II 1038, de VRIESE Journ Bot Neerl I 256.

PERAK *Scortechini* 1242, KING's Collector 2611, on Larut Peak at 3,000 to 3,500 feet — DISTRIB Sumatra, Java

De VRIESE says the gutta is only used for adulteration, but that Motley did not agree in this belief

VAR *glabrata*, KING & GAMBLE. Lower surface of the leaves nearly glabrous, apex abruptly long acuminate, pedicels 8 to 1 in long, fruit nearly spherical

PERAK *Scortechini* 536 SINGAPORE at Selitan, RIDLEY 5644

7 *PAYENA sessilis*, KING & GAMBLE, n sp. A tree (?), branchlets grey, rough, uppermost somewhat angular when dry. *Leaves* coriaceous, sessile, obovate, obtuse or emarginate, glabrous on both surfaces, margins recurved, 2 to 4 in long, 1 to 15 in broad, midrib prominent, raised on both surfaces, main nerves not prominent on the upper surface, raised on the lower, about 8 pairs, at about 50° with the midrib, straight but soon anastomosing with the prominent reticulations which are also raised on the lower surface, stipules ovate, acute or obtuse, glabrous, caducous. *Flowers* fascicled, 2 to 3 together, on small tubercles in the axils of upper leaves, pedicels slender, black, 5 in long, supported by small hard glabrous bracts. *Calyx lobes* in fruit 4, 2 in long, ovate acute, glabrous, rest of flower not seen. *Fruit* a globose glabrous berry, black when dry, prominently surmounted by the

persistent long curved style, cells apparently 4 to 6. *Seeds* oblong, obtuse at top, acute at base, 3 to 4 in long, rounded on the outer, straight on the inner side, hilum long, narrow, testa thin crustaceous, brown, albumen rather thin, cotyledons oblong, flat, 15 to 2 in in length, radicle rather large,

SINGAPORE *Ridley* 5076

8. *PAYENA OBTUSIFOLIA*, King & Gamble, n sp. A tree, branchlets stout, greyish-brown, prominently marked by the scars of fallen leaves and the tubercles of fallen flower fascicles, young branchlets and leaves rusty brown in colour. *Leaves* coriaceous, clustered at the ends of the branchlets, obovate or elliptic-obovate, obtuse, cmarginate or shortly acute at apex, cuneately attenuate at base, glabrous on the upper surface, rusty coloured and sometimes pubescent on the lower, 2.5 to 3 in long, 1 to 1.5 in broad, midrib stout, main nerves 10 to 12 pairs, starting at about 60° with the midrib, slightly curving upwards, inconspicuous above as are the reticulations, petiole 5 to 7.5 in long, channelled above by the decurrent margins of the blade. *Flowers* fascicled, 4 to 8 together (to judge by scars only) in the axils of the leaves, or of the scars of fallen leaves, pedicels 5 in long, clavate pubescent, buds about 3 in long, truncate. *Calyx-lobes* 4, 2 outer valvate, ovate-acute, 3 in long, pubescent, 2 inner imbricate, ovate, golden pubescent on the back, ciliate on the margins. *Corolla* not seen. *Ovary* ovoid conical, glabrous, 8 celled, style 3.5 in long, linear. *Fruit* not seen.

PERAK *Scortechini* 340

9. *PAYENA SILLANGORICA*, King & Gamble, n sp. A tree (?), branchlets dark brown, rough. *Leaves* chartaceo-coriaceous, oblong lanceolate, acuminate at apex, narrowly attenuate at base, glabrous above, slightly pubescent on the sides of the midrib beneath, 4 to 6 in long, 1 to 1.7 in broad, midrib prominent, impressed and keeled above, main nerves about 16 pairs, indistinct, parallel, at about 80° with the midrib, straight at first, anastomosing near the margin with the secondary nerves and reticulations, which are visible but not prominent. Petiole 5 to 7 in long, channelled above, enlarged at base. *Flowers* fascicled, 2 to 3 together, in the axils of the leaves, pedicels rather thick, 6 to 8 in long, striate, appressed, rusty pubescent. *Calyx-lobes* 4, outer pair valvate 3 in long, ovate acute, thick below, thinner above, inner pair ovate, 2.5 in long, scarious on the margins, both appressed, rusty pubescent, rest of flower not seen. *Ovary* pubescent, cylindrical depressed at top, fruit immature, seed apparently aluminous, with an elongated hilum.

SELANGOR *Ridley* 7387

## 6 BASSIA, Linn

Trees with milky juice *Leaves* coriaceous or chartaceous, often clustered at the ends of the branchlets, stipules caducous *Flowers* fascicled, in the axils of the leaves or of the scars of fallen leaves, pedicellate, pedicels frequently reflexed *Calyx lobes* 4, the 2 outer usually valvate, enclosing the 2 inner imbricate *Corolla* campanulate, tube broad, lobes 6 to 12, contorted in bud, erect in flower, imbricate *Stamens* twice the number of the corolla lobes or more, inserted in one or more rows on the corolla tube, filaments usually short, anthers generally lanceolate, laterally or extrorsely dehiscent, connective generally produced in an acumen, staminodes none *Ovary* villous, 4-12- (usually 6-8) -celled, style linear, subulate, more or less elongate *Fruit* a globose or oblong or ovoid berry, few seeded *Seeds* ellipsoid, usually compressed, testa crustaceous, shining, hilum oblong or linear, conspicuous, albumen none, cotyledons thick, fleshy, radicle small — **DISTRIB** About 40 species, found in India, Ceylon, the Malay Peninsula, and Malay Archipelago

In several of the species the fruit is unknown, and some of these may prove when it becomes available to belong to *Paysonia* which is hardly separable except by the important character of having albuminous seeds and leafy cotyledons

We have not followed Buillon and Engler in changing the name of this genus to *Illipe* as we agree in the opinions expressed by Drs Trimen ( *Flora of Ceylon* ) and Cooke ( *Flora of Bombay* ) that the word *Illipe* was not intended by Konig to be employed as the name of a genus but was merely mentioned as being the vernacular name employed by the natives of Malabar for one of the species

- |   |                         |
|---|-------------------------|
| Flower buds large, nearly 7 in long conical intramarginal nerve of leaves prominent pedicels thick, 1.5 to 2 in long                                    | 1 <i>B. aristulata</i>  |
| Flower buds moderately large about 4 in long globose intramarginal nerve present pedicels short about 4 in long —                                       |                         |
| Intramarginal nerve conspicuous leaves 10 to 14 in long   | 2 <i>B. himpani</i>     |
| Intramarginal nerve faint leaves 4 to 6 in long   | 3 <i>B. himpani</i>     |
| Flower buds moderately large 4 in long or rather less conical —   |                         |
| Leaves large over 6 in long main nerves prominent —   |                         |
| Pedicels over 1 in long leaves coriaceous silky pubescent beneath main nerves straight intramarginal nerve present connective of anthers penicillate    | 4 <i>B. penicillata</i> |
| Pedicels under 6 in long leaves chartaceous sparsely pubescent beneath main nerves curved, no intramarginal nerve connective of anthers not penicillate | 5 <i>B. malaccensis</i> |
| Leaves moderate sized under 6 in long, main nerves not prominent  | 6 <i>B. Curtissii</i>   |
| Flower buds small under 3 in long, usually conical generally in many flowered fascicles —   |                         |
| Pedicels usually under 3 in long —  |                         |
| Pedicels and flower buds densely tawny pubescent, connective of anthers produced in a long point .. ..  | 7 <i>B. laurifolia</i>  |

- Pedicels and flower buds thinly rusty-pubescent, connective of anthers produced in a short ciliate point .. 8. *B. rupicola*.
- Pedicels 5 in long or longer —
- Flowers fascicled in the axils of upper leaves generally, rarely on old wood below them —
- Leaves glabrous, coriaceous, main nerves indistinct 9 *B. perakensis*
- Leaves grey-silky-pubescent beneath, almost coriaceous, main nerves distinct but not prominent .. 10 *B. argentea*
- Leaves only slightly pubescent beneath, chartaceous, main nerves very prominent .. 11 *B. Braccana*
- Flower fascicled chiefly in the axils of the scars of fallen leaves, on old wood —
- Leaves chartaceous, elliptic, main nerves prominent 12 *B. longistyla*
- Leaves coriaceous, oblong, main nerves not prominent —
- Main nerves of leaves (under 6 in long) curved upwards, but no intramarginal nerve, anther connective long apiculate .. 13 *B. cuprea*
- Main nerves of leaves (over 6 in long) meeting in an intramarginal nerve, anther connective shortly apiculate .. 14 *B. Motleyana*

SPECIES OF WHICH FLOWERS ARE IMPERFECTLY KNOWN

- Leaves under 5 in long, obovate, obtuse, greenish brown when dry .. 15 *B. cuneata*
- Leaves 5 to 7 in long, oblong lanceolate, greyish green when dry .. 16 *B. penangiana*
- Leaves 6 to 8 in long, obovate oblong, orange red when dry 17 *B. erythrophylla*

1 *BASSIA ARISTULATA*, King & Gamble, n sp. A tree, branchlets stout, brown, lenticellate. Leaves coriaceous, oblong, shortly and rather suddenly acute at apex, somewhat rounded unequally and then decurrent at base, glabrous on both surfaces except on the midrib beneath, margins slightly recurved, 6 to 10 in long, 3 to 4 in broad, midrib thick, prominent, impressed above main-nerves 24 to 28 pairs, conspicuous, parallel, 3 to 4 in apart, starting at about 75% with the midrib, scarcely curved, meeting in a conspicuous intramarginal looped nerve, reticulations oblique, not prominent, petiole 1.5 to 2 in long, grooved above, much thickened below. Flowers fascicled, about 2 to 6 together, in the axils of the leaves or of the scars of fallen leaves, on very short tubercles, pedicels thick, 1.5 to 2 in long, densely golden pubescent, flattened under the flower, buds elongate, conical, nearly 75% in long. Calyx-lobes 4, 5 to 7 in long, the 2 outer valvate, triangular ovate, pubescent, the 2 inner imbricate, concave, ovate, pubescent. Corolla-tube short, 2 to 3 in long, funnel-shaped, densely pubescent inside, lobes 8 to 9, oblong lanceolate, 4 in long, pubescent without. Stamens many, up to 36, in 2 or 3 rows, lowest row about 8 to 9, second row 16 to 18, third row 8 to 9, inserted on the top of the corolla tube, filaments very short, pubescent, anthers

oblong, thin, 2 in long, opening along their edge, connective black, prominent ending in a long sharp awn, the anthers usually twisted half round Ovary silky-pubescent, flat at top, style glabrous about equal to corolla, cells 10 to 12 Fruit not known

PERAK at Goping, *Scortechini* 1984

Said by *Scortechini* to give a guttapercha

2 *BASSIA KINGIANA*, Brace MS in Herb Calc A tree, reaching 50 to 60 feet in height, and 10 to 15 in in diam, branchlets thick. Leaves coriaceous, dark green, obovate oblong, rounded and then shortly and abruptly acuminate at apex, cuneate at base, glabrous on both surfaces, margins slightly reflexed, 10 to 14 in long, 3.5 to 4.5 in broad, midrib very strong, prominent, main nerves about 20 pairs, conspicuous, 5 to 7 in apart, starting nearly at right angles to the midrib and curving upwards to meet in a conspicuous intramarginal looped nerve, secondary nerves few but prominent, reticulations distant, not numerous, petiole 2 in long, grooved above, swollen at base, and then conspicuously rugose when dry, stipules subulate acuminate from a broad base, very quickly caducous Flowers fascicled, about 3 to 5 together, on small tubercles above the scars of fallen leaves on the previous year's wood, pedicels recurved, thick, 4 in long, enlarged above, covered as also the calyx with appressed tawny pubescence buds globose, about 4 in long Calyx lobes 4, 4 in in diam outer 2 imbricate, rounded emarginate, thick inner 2 also imbricate, concave, ciliate on the margins Corolla tube funnel shaped, 15 in long, rusty hirsute without, pubescent within lobes 12 to 16, white much imbricate or in 2 rows, spatulate, ciliate on the margins, hirsute, 25 in long Stamens many 32 to 36, in 2 rows on the top of the corolla tube filaments 1 in long rather stout, densely hirsute, anthers linear oblong, 12.5 in long connective produced into a broad appendage, penicillate at tip in bud merely aristate Ovary rounded, villous, style thick, curved, pubescent 3 in long, with minute stigmatic lobes, cells about 8 Fruit a globose, thickly tawny pubescent, berry, 7.5 in in diam, surmounted by the long subulate persistent style, seeds 1 to 2 Seed not seen

PERAK *Kinny* Collector 3314, 3678, 7389, in open jungle at 300 to 500 feet SINGAPORE *Ridley* 6238, 6294

3 *BASSIA KUNSTLERI*, Brace MS in Herb Calc A tree with spreading branches, reaching a height of 30 to 40 feet and 10 to 15 in in diam, branchlets slender, grey, innovations rusty-pubescent Leaves chartaceous, obovate oblong or oblong, abruptly acuminate at apex, acuminate at base, glabrous on both surfaces, 4 to 6 in long,

1.5 to 2 in broad, midrib slender, prominent, main-nerves 15 to 20 pairs, starting at an angle of about 60° to the midrib and curving upwards to meet in a faint intramarginal looped nerve, secondary nerves and reticulations prominent, petiole slender, 1 to 1.5 in long, bordered above in its upper part by the decurrent margins of the blade, base enlarged, sometimes twisted. *Flowers* solitary or fascicled 2 to 3 together in the axils of the leaves, or above the scars of fallen leaves, pedicels thick, 3 to 4 in long, usually recurved, densely rusty- or golden-pubescent like the calyx-lobes and fruit, buds ovoid-orbicular about 4 in long. *Calyx-lobes* 4, 4 in long, outer valvate, ovate orbicular, inner imbricate, concave, somewhat emarginate, thin and ciliate on the edges. *Corolla* tubular campanulate, tube about 1.25 in long, glabrous on both sides, lobes 16, in 2 rows, very much imbricate, shortly spatulate, rounded at top, fimbriate on the margins, shortly pubescent within, 3-nerved. *Stamens* about 32, in 2 rows, mixed with long unicellular brown hairs, filaments thick, about 0.5 in long, anthers oblong, opening by marginal slits often twisted half round, connective conspicuous, produced in a sharp mucro. *Ovary* rounded, villous, style subulate, 5 to 7 in long, cells about 8. *Fruit* an ovoid densely pubescent brown berry, 8 to 1.1 in long, 1 2-seeded, surmounted by the persistent style. *Seed* ovoid, obliquely pointed below, rounded above, 7 in long, 4 in in diam, sometimes flattened on one side, testa thin, crustaceous, chestnut-brown, shining, hilum very large, obovate, albumen none, cotyledons thick, 5 in long, ovate, radicle small, pointed.

PERAK on Larut peak, at 500 to 2,600 feet, *King's Collector*, 3241, 3547, 3964, 6410. *Wray* 2643, 3201, *Curtis* 3694, *Ridley* 5536.

4. *BASIA FENICILLATA*, King & Gamble, n. sp. A large tree, reaching 60 feet in height with a girth of 4 feet, ultimate branchlets and innovations densely ferruginous pubescent. *Leaves* coriaceous, oblong or somewhat obovate oblong, shortly and abruptly acute at apex, unequally rounded at base, glabrous above, thickly golden-silky-pubescent beneath when young, afterwards glabrate, margins recurved, 6 to 10 in long, 2.5 to 3.5 in broad, midrib thick, prominent, impressed and keeled above, main-nerves 24 to 28 pairs, conspicuous, parallel, 3 to 5 in apart in large leaves, starting at about 80° with the midrib, curved only near the margin to meet in an inconspicuous looped intramarginal nerve, secondary nerves many in large leaves, reticulations oblique, not prominent, petiole 1.2 to 1.5 in long, thickened below. *Flowers* fascicled, about 1 to 4 together in the axils of the leaves, on very short rusty-pubescent tubercles, pedicels 1 to 1.2 in long, slender, pubescent, buds conical. *Calyx-lobes* 4, sometimes 5, .4 in long; outer pair ovate-acuminate, densely rusty-pubescent, thick, inner pair,



sometimes 3, ovate acuminate, thinner, pubescent on the back, ciliate and more or less scarious on the margins *Corolla* campanulate, 4 in. long, tube nearly 2 in long, glabrous outside, densely ferruginous hairy within in the upper half, lobes 10 (?), lanceolate, acuminate, as long as tube *Stamens* 20 in 1 row, but the 10 opposite the corolla-lobes behind the 10 alternate with them, filaments 0.5 in long, hairy, anthers linear-sagittate, extrorse, the connective produced in a long penicillate acumen *Ovary* rounded, densely hairy, as is the lower half of the 7.5 in long slender style, cells 10 *Fruit* not known

PROVINCE WELLESLEY at Tassek Glugor, *Curtis* 3737, said to be common Vern name "Mingato"

In its leaves this species greatly resembles *B. aristulata*, but the slender pedicels, smaller flowers, acuminate calyx, and penicillate anthers at once distinguish it

5 *BASSIA MALACCENSIS*, King & Gamble A large tree (?), branchlets dark brown, rough, with prominent old leaf-scars, innovations nearly glabrous *Leaves* chartaceous or almost membranous, obovate or obovate oblong, obtuse or shortly and abruptly acute at apex, cuneate at base, glabrous above, sparsely and minutely pubescent beneath when young, glabrous when old, 6 to 12 in long, 4 to 6.5 in broad, midrib prominent, thick, main nerves very conspicuous, 14 to 16 pairs, parallel, in average leaves 5 in apart, in large ones often nearly 1 in, starting at an angle of 60° with the midrib, at once curving gently upwards to and along the margin, secondary nerves few, reticulations mostly transverse, not prominent, petiole 1 to 2 in long, slightly bordered above to about half way down by the decurrent margins of the blade base much swollen, wrinkled *Flowers* fascicled 4 to 8 together in the axils of the leaves or of the scars of fallen leaves on rather thick pubescent tubercles, pedicels 4 to 6 in long, pubescent, buds when young rounded conical *Calyx lobes* 4, 2 outer valvate or slightly imbricate, ovate, bluntly acute or mucronate, rusty pubescent, 2.5 in long, 2 inner imbricate, ovate acute, margins sometimes scarious, sometimes ciliate, back thickly rusty pubescent, more or less keeled *Corolla* campanulate, tube very short, rarely 1 in long, with a short ring of hairs at the mouth inside, lobes 10-12, lanceolate obtuse, sub 2 seriate 2.5 to 3 in long, glabrous except for a few stiff hairs on *Stamens* 20 to 24 in 2 rows, the inner almost or quite sessile, alternate with the corolla lobes, the outer with short densely pubescent filaments longer than the inner ones, anthers narrowly lanceolate with long hairs, opening on the margins, connective produced in a long hair like acumen *Ovary* hairy, elongate, conical, style 2.5 in long *Fruit* a fleshy obovate-oblong berry with somewhat flattened top, surmounted

by the persistent base of the style and supported by the persistent calyx lobes, nearly 1 in long. Seed 1, oblong, acute at the top, 7 in long, 35 in broad, and about 3 in thick, testa shining, crustaceous, chestnut brown, hilum 15 to 2 in broad, albumen none, cotyledons thick, inner face somewhat striate, radicle rather large, inferior. *Payena malaccensis*, Clarke in Hook f Fl Br Ind III 547 *Keralephorus Wightii*, Maingay MS (not of Hassk.)

MALACCA Griffith (K D) 3610, Mamgay (K D) 992 PERAK Wray 1229, *Scolecium* 314 SINGAPORE Iudky 2082, 2757, 5643, 6042, 6132, 6133 6498, 6499, 6500, 6531, 8078, 10159

Wray says this species gives only a sticky gutta in small quantities

6 *BASSIA CURTISII*, King & Gamble, n sp. A tree, reaching 40 to 50 feet in height, branches greyish brown, strongly marked by the scars of fallen leaves and the prominent tubercles of fallen flowers innovations very slightly rusty pubescent, thick. Leaves very coriaceous clustered at the ends of the branchlets, obovate or sometimes lanceolate obovate, obtuse emarginate or very suddenly and shortly blunt acuminate, glabrous on both surfaces, margins strongly recurved 4 to 6 in long, 1.25 to 2.5 in broad midrib stout, prominent main nerves not prominent 14 to 15 pairs, at an angle of about 70° with the midrib, 3 to 4 in apart straight, joined near the margin by a looped intramarginal nerve, secondary nerves prominent reticulations few all raised on the under surface petiole 7 to 1 in long, rather thick, bordered by the decurrent margins of the blade base swollen. Flowers fascicled, many (10 to 12) together on prominent tubercles in the axils of the scars of fallen leaves below the leaf cluster and covering the branchlets densely for a distance of about 4 in pedicels 25 (buds) to 5 (flower) in long, somewhat angular decurved densely pale tawny pubescent buds ovoid conical. Calyx lobes rounded, obtuse, densely tawny pubescent, 2 in long, the outer pair thick, the inner somewhat keeled, scarious on the margins. Corolla campanulate rather longer than the calyx tube short glabrous except for the ring of hairs at the insertion of the stamens, lobes 8, oblong spatulate ciliate and hirsute at the tip. Stamens 16, filaments short, slender, villous, anthers ovate acute the connective ending in a sharp conical acumen, extrorse. Ovary rounded, villous style thick glabrous, stigma minute cells 8. Fruit an oblong berry, covered without with appressed golden pubescence, 5 to 7 in long, 5 in broad, crowned with the persistent style and supported by the persistent calyx, seeds 1-2, placentas thin. Seeds oblong, pointed at the ends testa crustaceous, shining hilum narrow, albumen none, cotyledons thick, fleshy, radicle small.

PENANG: Curtis 1451, 3536. PERAK: Wray 512, Vern. "Gutta Gannu", Scortechini 1408.

This species comes near both to *B. Molleyana*, from which it differs in having more coriaceous leaves, larger flowers, and a pubescent fruit; and to *B. cuneata*, in which the leaves (judging from the poor specimens in Kew Herbarium) are thinner and the fruit larger and nearly glabrous, with more rounded seeds and a broad hilum.

7. *BASSIA LAURIFOLIA*, King & Gamble, n. sp. A tree reaching 60 feet in height and a diam. of 12 to 18 in.; branches spreading; branchlets pale brown, rather thick, innovations densely pubescent with yellowish-tawny hairs. *Leaves* chartaceous; obovate-lanceolate, gradually acuminate at apex, also at base; glabrous on both surfaces except on the sides of the midrib beneath; 5 to 10 in. long, 1.5 to 3.5 in. broad, midrib prominent, impressed and keeled above; main-nerves prominent, regular, 14 or 15 pairs, about 3 in. apart, starting at about 45° with the midrib, gradually curving upwards; reticulations obliquely transverse, faintly marked; petiole .75 to 1 in. long, slender, glabrous above, tawny-pubescent at base, bordered by the decurrent margins of the blade and marked above by the produced keel of the midrib, stipules linear-subulate, tawny-pubescent, nearly .5 in. long, very caducous. *Flowers* fascicled, about 6 together, on hairy tubercles in the axils of the leaves or of the scars of fallen leaves near the top of the branchlets, pedicels 4 to .5 in. long, usually recurved, densely tawny-pubescent, thicker in fruit; buds small, conical. *Calyx-lobes* 4, about .2 in. long, rather narrowly ovate; the outer pair obtuse; the inner acute, all densely tawny-pubescent without, glabrous within. *Corolla* campanulate; tube .05 in. long with a ring of hairs at the mouth inside, lobes 8, oblong-spathulate, 1 in. long, glabrous. *Stamens* 14 to 16, .1 in. long; filaments short, thickly hairy; anthers linear-sagittate, the connective produced in a long sharp acumen. *Ovary* rounded, glabrous; style slender, 3 in. long, cells apparently 8. *Fruit* a black glabrous oblong berry about .6 to .7 in. long and .4 in. broad. *Seed* 1, ovoid, .5 to .6 in. long, slightly compressed; testa thin, crustaceous, shining, dark brown, hilum broad, albumen none, cotyledons oblong, fleshy, about 3 in. long and nearly 2 in. broad; radicle inferior, rather large.

PERAK. on low ground, King's Collector 3104, 3718, 3720.

VAR. *obtusa*, King & Gamble. *Leaves* obtuse with an abrupt acumen. *Calyx-lobes* obtuse, thickened at tip. *Corolla-lobes* ciliate at the apex, glandular-striate; anthers and produced connective very hirsute.

PENANG: Curtis 159, 2254, 3589—a small tree, fairly common.

VAR. *parvifolia*, King & Gamble. *Leaves* smaller than in type;

innovations not tawny pubescent *Calyx-lobes* more rounded and glabrous, pedicels longer

KEDAH on Kedah Peak, Ridley 5506

Ridley's No 2678 from Tahan Woods, Pahang, is very near *B laurifolia*, but the pedicels are much longer and the calyx lobes not tawny pubescent. The material is insufficient for description.

8 *BASSIA RUPICOLA*, King & Gamble, n sp. A tree reaching 40 to 60 feet in height and 15 to 20 in in diam, branchlets dark grey, marked by the prominent scars of fallen leaves, innovations puberulous, leaf-bud scales ovate lanceolate, 25 in long. *Leaves* coriaceous, obovate oblong, bluntly acute at apex, cuneately attenuate at base, dull and glabrous on both surfaces, 3.5 to 5.5 in long, 1.5 to 2 in broad, midrib thick, conspicuous, main nerves 8 to 10 pairs, starting at an angle of 45° with the midrib, then curving upwards, sometimes rather indistinct, about 4 in apart, reticulations many, obscure, obliquely transverse, petiole 5 to 1 in long, grooved above and bordered by the decurrent base of the blade, swollen below. *Flowers* fascicled, about 5 together, in the axils of the leaves, on small tubercles, pedicels 15 in long, ferruginous pubescent like the calyx and buds. (*calyx-lobes* 4, 2 outer valvate, 2 inner valvate or imbricate, ovate, 2 to 2.5 in long, all more or less recurved and ciliate at tip. *Corolla* tubular campanulate, lobes and tube nearly equal, mouth of tube inside with a ring of soft ferruginous hairs, lobes oblong, ciliate at tip, sparsely hairy without, nerves spreading. *Stamens* 16, inserted above the ring of hairs in the mouth of the tube, filaments slender, .05 in long, pubescent, anthers ovate mucronate, tip ciliate, extrorse. *Ovary* ovoid, style curved, 3 in long, stigma flat, minute.  *fruit* not seen.

PERAK in rocky crevices on Gunong Batu at 1,500 to 2,000 feet, King's Collector 7411

9 *BASSIA PERAKENSIS*, King & Gamble, n sp. A tree reaching 60 to 80 feet in height and a considerable girth, branchlets thick, dark grey, prominently marked by the scars of fallen leaves and the tubercles on which the flower fascicles grew. *Leaves* coriaceous, oblong or obovate oblong, shortly and abruptly acuminate at apex, acuminate narrowed at base, margins recurved, glabrous on both surfaces, 4 to 6 in long, 1.5 to 2.5 in broad, midrib stout, prominent, main nerves slender, indistinct, 14 to 18 pairs, starting at an angle of 50° with the midrib, parallel, straight at first, arching near the margin to join in an intra-marginal looped nerve which is also met by the secondary nerves between the main ones, reticulations faintly marked on both surfaces, petiole .75 to 1 in. long, rather thick, bordered above by the decurrent

margins of the blade, swollen below *Flowers* in fascicles of up to 10 to 12, on tubercles in the axils of the leaves or above the scars of fallen leaves on the previous year's wood, pedicels 5 to 6 in long, slender, flattened below the flowers, densely pubescent at first, afterwards nearly glabrous, recurved in fruit, buds small, conical *Calyx-lobes* 4, 2 in long, 2 upper ovate-acute, densely pubescent, valvate, 2 lower imbricate, also densely pubescent, ciliate on the margins, somewhat keeled, ovate-acute *Corolla* funnel-shaped, lobes 8, throat villous *Stamens* about 16, filaments short glabrous, anthers sagittate *Ovary* globose, villous, 8-celled, style 3 to 4 in long, stigma minutely lobed *Fruit* an ovoid densely pubescent berry about 7 to 9 in in diam, crowned by the persistent style, seeds 1-2 *Seed* ovoid oblong, 65 in by 35 in, acute at base, testa shining, chestnut brown, thin, crustaceous, hilum large, oblong, albumen none, cotyledons oblong, 45 in long, 25 in broad, radicle very small

**PRAK** *King's Collector* 512, 3846, *Curtis* 3695, on the Larut hill up to 2,500 feet.

10 **BASSIA ARGENTEA**, Clarke in Hook f Fl Br Ind. III 545 (1882) (*not of de Vriese*) A large tree, branchlets rather thick, greyish brown *Leaves* coriaceous-chartaceous, elliptic or elliptic-oblong, abruptly acuminate at apex, acute and often unequal at base, glabrous above, shining grey-silky beneath when young, nearly glabrous when old, 4 to 7 in long, 2.5 to 3 in broad, midrib prominent, thick, main nerves 13 to 15 pairs, about 4 in apart, starting at about 60° with the midrib, at first straight then curving upwards, reticulations many, very oblique, petiole 1 in long, upper part bordered by the decurrent margin of the blade, swollen below and rugose *Flowers* fascicled in clusters of 6 to 10 in the axils of the leaves, or above the scars of fallen leaves, pedicels slender, about .5 in long, appressed pubescent, buds conical *Calyx-lobes* 4, outer and inner pairs both valvate, lobes ovate, .2 to .25 in long, acute, pubescent *Corolla* tubular campanulate, tube 1 in long, lobes 8 to 9, 15 in long, linear-oblong *Stamens* usually 24, in 3 rows, inserted on the top of the tube on a ring of rusty hairs, filaments very small or none, anthers ovate, densely hispid, black apiculate *Ovary* rounded, depressed above, villous, style 2 to 3 in long, villous half way up, subulate, stigma capitate, cells 8 to 10 *Fruit* not seen

**MALACCA** *Mammy* (H D) 991, 1524, *Derry* 941

*Bassia argentea* de Vriese, seems to be a *Sideroxylon*, cf Burret & Kooid & Val

11 **BASSIA BRACEANA**, King & Gamble, n. sp. A tree with spreading branches, reaching 50 to 70 feet in height and 10 to 20 in in diam., branchlets pale brown *Leaves* chartaceous, bright green, glossy,

oblong or elliptic-oblong, acuminate both at apex and at base, glabrous above, minutely pubescent on the nerves or in the axils of the nerves beneath, 4 to 8 in long, 2 to 3 in broad, midrib thick, impressed above, main nerves 14 to 18 pairs, regular, parallel, conspicuous, about 4 in apart, starting at about 60 with the midrib, arching upwards to join near the margin, reticulations oblique, slender but conspicuous, joining the main-nerves more or less horizontally, petiole 8 to 14 in long, grooved above and bordered by the decurrent margins of the blade, thickened and somewhat curved below. *Flowers* fasciculate, usually 4 to 7 together, in the axils of the leaves, or above the scars of fallen leaves on the last year's wood below, pedicels 4 to 6 in long, thickened above, otherwise slender, slightly pubescent. *Calyx* lobes 4, 15 to 25 in long, 2 outer opposite ovate rounded, enclosing the 2 inner concave rounded sometimes ciliate on the margins, sometimes slightly emarginate, all more or less golden pubescent without, enlarged after flowering. *Corolla* cream coloured, tube cylindrical, short about 1 in long only, lobes more or less spreading, 8 to 9, linear-oblong, 2 in long slightly twisted. *Stamens* 16 to 18, in 2 rows, inscribed on the top of the tube inside above a thick ring of tawny hairs, filaments very short, anthers ovate lanceolate, strigosely hirsute, the connective ending in a long dark acumen. *Ovary* globose, glabrous, style 15 in long, stigmas very minute cells about 8. *Fruit* an oblong green fleshy berry, 8 to 1 in long crowned by the remains of the style seed usually 1 only. *Seed* ovoid, flattened, 8 in long, 5 in broad, and 25 in thick testachestnut brown, shining, crustaceous, hilum elongate, pale, conspicuous, albumen none, cotyledons thick, 5 to 6 in long, ovoid, somewhat acute, radicle minute.

PFNANG *Curtis* 3063. PFRAK *King's Collector* 1846, 3195, 3275, 3740, 6447, 7584, 10412. SCORTECHINI 314, 1483. WRAY 1775, 2613, 2694.

VAR *lanceolata*, King & Gamble. *Leaves* narrower, more lanceolate acuminate, main nerves closer. *Flowers* more numerous in the fascicles and fascicles more numerous on the last year's wood. *Corolla* lobes often unequal in length, acute. *Anthers* with the acumen bifid.

PFRAK Wray 189, 1248, up to 3,400 feet

13. *BASSIA LONGISYRIA*, King & Gamble, n. sp. A large tree, reaching 80 to 100 feet in height, branchlets thick, dark greyish brown, innovations minutely pubescent. *Leaves* chartaceous, elliptic, shortly and rather abruptly acuminate at both apex and base, glabrous on both surfaces, 3.5 to 5 in long, 1.5 to 2 in broad, midrib slender, main nerves 12 to 14 pairs, leaving the midrib almost at right

angles and curving upwards to meet near the margin, secondary nerves somewhat prominent as are the reticulations, petiole 6 to 8 in. long, slender, grooved above. *Flowers* fascicled, often up to 10 together, on tubercles above the scars of fallen leaves on the last year's wood, pedicels slender, glabrous, 5 to 7 in long. *Calyx-lobes* 4, 15 to 2 in. long, ovate, somewhat acute, somewhat pubescent outside, the 2 outer enclosing the 2 inner. *Corolla* with very short (0.5 in long) cylindrical tube, lobes 8 to 9, rather spreading, oblong-lanceolate, obtuse or emarginate, prominently nerved, glabrous. *Stamens* 16 to 18, 2 in. long, inserted in 2 rows on the top of the tube above a short ring of tawny hairs, filaments 1.25 in long, slender, anthers ovate, 0.75 in long, apiculate, exserted. *Ovary* cylindrical, style 5 in long, surmounted by a minute rounded stigma. *Fruit* unknown.

PERAK *Kiny's Collector* 2680 SINGAPORE *Ridley* 6498 (?)

This species comes very near to *B. Braccana*, but the anthers differ so much that we hesitate to join them.

13 *BASSIA CUPREA*, King & Gamble, n. sp. A tree reaching 60 to 70 feet in height, branchlets thick, brown, uppermost somewhat angular. *Leaves* coriaceous, oblong, obtuse or emarginate at apex, attenuate at base and somewhat unequal, glabrous above, sparsely hairy on the nerves beneath, otherwise glabrous, 4.5 to 6 in long, 2.5 to 3 in broad, of a coppery brown colour when dry, midrib very thick and prominent, main nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin, reticulations visible but not strong, petiole thick, .75 to 1 in long, bordered above by the decurrent margin of the blade. *Flowers* fasciculate in the axils of the leaves or of the scars of fallen leaves, 2 to 5 or more in a fascicle, fragrant, pedicels 5 in long, pubescent, buds conical, 3 in long. *Calyx lobes* 4, .25 in long, 2 outer valvate, broadly ovate, shortly pubescent, 2 inner rounded concave, shallowly emarginate, ciliate and scarious on the margins, pubescent without. *Corolla* 4 in long, tube funnel shaped 1 in long, mouth densely brown-hirsute, lobes 8-9, erect or spreading 3 in long oblong, rounded at apex, long brown-silky pubescent on back, strigosely hairy within. *Stamen* 18 to 22, inserted on the mouth of the tube, filaments hairy, .05 in l.  $\sigma$ , anthers ovate acuminate, 15 in long, the connective produced long usually curved acumen strigosely hirsute. *Ovary* oblong, glabrous 8-10 celled, ending in a style 5 in long surmounted by a minutely 9-10 lobed flat stigma. *Fruit* not seen.

PERAK *Scottichum* 1879

This species comes near to *B. Motleyana*, Clarke, but the flowers are much larger and different.

14 *BASSIA MOTLEYANA*, Clarke in Hook f Fl Br Ind III 546 (1882) An erect lofty tree of swampy places, branchlets dark brown, marked by prominent leaf scars. *Leaves* coriaceous, elliptic, shortly and abruptly acuminate at apex, cuneate at base, the two sides sometimes unequal, glabrous on both surfaces, 4 to 5 in long, 1.5 to 2.5 in broad, midrib prominent, raised above, main nerves 10 to 12 pairs, irregularly spaced, generally at about an angle of 60° with the midrib, meeting near the margin in a looped intramarginal nerve, secondary nerves prominent similar to the main-nerves, reticulations few, petiole 8 to 12 in long, rather thick, bordered by the decurrent margins of the blade. *Flowers* fascicled, many together (10 to 12), in the axils of the leaves or of the scars of fallen leaves below the terminal tuft, often fully clothing the branchlets for a distance of 6 in or more, pedicels slender, 1 to 7 in long, buds ovoid. *Calyx-lobes* 4, 1.5 to 2 in long, ovate, obtuse or somewhat acute, sparsely pubescent, the inner pair somewhat scarious on the margins. *Corolla* campanulate, 1.5 to 2 in long, tube short, about  $\frac{1}{3}$  of the whole, lobes 8, 4 outer enclosing 4 inner, oblong-spathulate, obtuse at tip and ciliate ferruginous pubescent. *Stamens* 16, inserted on the top of the tube on a ring of long ferruginous hairs, filaments short, slender, anthers ovate lanceolate, short apiculate. *Ovary* rounded, villous, 3-8 celled, style 5 in long, thick, sparsely pubescent. *Fruit* an obovoid glabrous berry, acute at top and furnished with the remains of the persistent style, calyx lobes also persistent, 5 in long, 3 in broad, 1-2 seeded. *Seeds* oblong, acute at both ends, testa crustaceous, shining, albumen none, cotyledons fleshy, radicle small. Burck in Ann Jard Bot V 44. *Isonanthe Motleyana*, de Vries in Miq Journ Bot Neerl I (1861) 257.

**MALACCA** Griffith (K D) 3608, *Derry* 1026. **JOHORE** *Ridley* 6496. **SINGAPORE** *Ridley* 5645 5896. —**DISTRIB** Borneo (*vide* Burck)

De Vries says the milky juice gives a gutta of bad quality being more watery and fragrant than that of other kinds.

**VAR** *Scortechinii*, King & Gamble. *Leaves* much larger, 6 to 8 in long, 2.5 to 3.5 in broad, main nerves 15 or 16 pairs. *Fruit* nearly globose—a dark green berry, shining when dry.

**PERAK** *Scortechinii*, at Port Weld, No 1550. *King's Collector* 5454 6735, on low, wet ground—a tree reaching 60 to 80 feet in height and 15 to 20 in in diam.

15 *BASSIA CUNEATA*, Bl Bijdr 675. A tree (?), branchlets dark brown, scarred, rather thick. *Leaves* coriaceous, clustered at the ends of the branchlets, greenish-brown when dry, obovate, obtuse emarginate or very shortly and abruptly acute at apex, cuneate at base,



glabrous, margins slightly recurved, 4 to 5 in long, 2 to 3 in broad, midrib stout, prominent, impressed above, main-nerves not prominent, about 20 pairs, nearly at right angles to the midrib, anastomosing near the margin with the secondary nerves, reticulations transverse, petiole 6 to 1 in long, bordered by the decurrent margins of the blade. *Flowers* in axillary fascicles as long as the petiole, not seen. *Fruit* a globose berry 75 to 1 in in diam, 1-3 seeded. *Seeds* 5 to 7 in long, 5 in broad and thick, ovoid, not compressed, pointed at both ends, testa crustaceous, chestnut brown, shining, hilum very broad (4 in), albumen none, cotyledons fleshy, semi ellipsoidal. *Miq Fl Ind Bat* II 1041, *A DC Prod VIII* 199, *Clarke in Hook f Fl Br Ind III* 546, *Koord & Val Bijdr I* 154.

MALACCA *Mungray* (K D) 986 SINGAPORE *Ridley* 6502 —  
DISTRIB Java.

16 *BASSIA PENANGIANA*, King & Gamble, n sp. A tree (?), branchlets dark grey. *Leaves* chartaceous, oblong lanceolate, acutely attenuate at both ends, glabrous, greyish green when dry, 5 to 7 in long, 1.5 to 2.5 in broad, midrib broad, conspicuous, impressed above and then keeled, main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib and curved upwards to and along the margin, reticulations transverse, raised above. *Petiole* 1 to 1.2 in long, bordered by the decurrent margins of the blade, swollen at base, stipules very small, ovate, pubescent, caducous. *Flowers* in fascicles of about 5 to 6 in the axils of the leaves, pedicels slender, 4 to 5 in long, appressed rusty-pubescent. *Calyx* lobes 4, ovate, obtusely acuminate, recurved, 2 in long, lower half thick, wrinkled, upper half thinner, somewhat scarious, sparsely appressed golden pubescent. *Corolla* tubular campanulate 2.5 in long, lobes 8 (?), oblong-spathulate, glabrous within, golden pubescent without, tube rather shorter than lobes. *Stamens* 16 (?), inserted in a ring of hairs on the top of the tube, filaments slender, anthers linear oblong, hirsute, the connective produced in a rather long somewhat blunt penicillate mucro. *Ovary* conical, glabrous, style slender, 3 in long, cells 8.

PINANG *Curtis* 1450

17 *BASSIA ERYTHROHYLLA*, King & Gamble, n sp. A tree, 40 to 50 feet in height and 1 foot in diam, branchlets thick, grey, naked with the scars of fallen leaves and the tubercles of fallen fls. *Leaves* coriaceous obovate oblong, shortly and bluntly acuminate, apex, unequally attenuate at base, glabrous, orange-red when dry, margins slightly recurved, 6 to 8 in long, 1.5 to 2.5 in broad, midrib thick, prominent below, impressed above, main nerves 10 to 12 pairs, rather irregular, starting at an angle of 60° from the midrib and

curved upwards to and along the margin, reticulations transverse, prominent, raised beneath petiole 1.5 to 2 in long, thickened at base, bordered above by the decurrent margins of the blade, younger ones golden-pubescent, stipules linear-subulate, 3 to 4 in long, quickly caducous. *Flowers* fascicled, about 5 to 6 together, on raised tubercles above the scars of fallen leaves on year old wood pedicels in fruit thick, 5 to 6 in long, golden pubescent. *Calyx-lobes* 4 in fruit ovate-acute or rounded, densely golden-pubescent on both surfaces, thick rest unknown. *Fruit* a globose, golden pubescent, berry somewhat depressed at top and bearing the remains of the persistent style, 5 to 6 in in diam. *Seed* not seen.

PENANG at Highlands, *Cultus* 3652 (Kew) or 5652 (Calc)

# 7 PALAQIUM, Blanco.

Trees, often of great size and containing a milky juice. *Leaves* usually coriaceous, obovate or oblong, petioled, entire, sometimes covered beneath with a dense silky or tawny pubescence. *Flowers* fasciculate, in the axils of the leaves or of the scars of fallen leaves, pedicellate. *Calyx* of 6 lobes, the outer 3 valvate, the inner 3 imbricate. *Corolla* usually campanulate, tube short, lobes 6, imbricate, often contorted in bud. *Stamens* 12 or more (up to 18), opposite to and alternate with the corolla lobes, those alternate often shorter and sometimes inserted higher up the tube, anthers ovate-lanceolate, dehiscence extrorse, connective produced, staminodes none. *Ovary* villous, 6 celled style subulate. *Fruit* a fleshy, ovoid or ellipsoid berry, 1-2 seeded. *Seeds* large, exalbuminous, the testa crustaceous, cotyledons thick fleshy, radicle pointed, inferior. — **DISTRIB.** About 50 to 60 species found in South India, Ceylon, Eastern Bengal, Burma, the Malay Peninsula and Archipelago, the Philippines, and Samoa (1 sp.) **DICHOMIS**, Thw in Gen Pl II 658

Pedicels never over 7.5 in long distributed for some distance down the upper branchlets

*Leaves* large, 5 to 12 in long, obovate obtuse, branchlets stout nearly 5 in thick —

*Leaves* nearly glabrous and glaucescent beneath main nerves distant irregular .. ..

1 *P. obovatum*

*Leaves* ferruginous pubescent or tomentose beneath, main nerves fairly close and regular —

*Leaves* appressed pubescent beneath, midrib glabrous on upper surface .. ..

2 *P. Mangayi*

*Leaves* spreading tomentose beneath, midrib hairy on upper surface .. ..

3 *P. Clarkeanum*

*Leaves* rarely over 6 in long, branchlets rarely 2.5 in thick —

*Leaves* always more or less obovate —

- Leaves golden silky pubescent beneath —
- Main nerves close, over 20 pairs .. .. 4. *P. Gutta*
- Main nerves about  $\frac{1}{2}$  in apart, under 20 pairs . 5 *P. Oxleyanum.*
- Leaves not or only very slightly silky pubescent beneath —
- Leaves conspicuously red or yellow when dry . 6 *P. xanthochyllum.*
- Leaves not conspicuously red or yellow when dry, usually brown or greenish brown —
- Leaves over 3 in long . .. 7 *P. bancanum*
- Leaves 2 to 3 in long . .. 8 *P. Ridleyi*
- Leaves under 2 in long . . . 9 *P. microphyllum*
- Leaves elliptic, not obovate —
- Produced connective of anthers bifid at point; leaves glabrous .. . 10 *P. hexandrum*
- Produced connective of anthers simple at point, leaves grey pubescent beneath 11 *P. Herveyi*
- Pedicels 1 in long or longer, clustered only at the extreme ends of the branchlets, leaves oblong lanceolate, 3-6 in long .. 12 *P. stellatum*

1. **PALAEQUIM OBOVATUM**, King & Gamble A big tree with a foxy odour (Ridley), overgreen, the branches thick, brown, marked by the very prominent scars of fallen leaves, leaves clustered towards the ends of the branchlets, innovations rusty pubescent *Leaves* coriaceous, obovate-cuneate or obovate-oblong, obtuse or very shortly acute at apex, cuneate at base, recurved and somewhat undulate on the margins, glabrous above, glaucescent beneath, 5 to 12 in long, 2 to 4 in broad, midrib thick, prominent, impressed above, much raised beneath, main-nerves about 12 pairs, at an angle of 40 to 45 with the midrib, inconspicuous above, raised and prominent beneath, reticulations many, oblique, obscure, petiole thick, 7 to 1 in long, bordered above by the decurrent margins of the blade, glabrescent or slightly rusty pubescent *Flowers* in clusters in the axils of the leaves or on tubercles above the scars of fallen leaves, pedicels 3 to 5 together, 3 to 5 in long, rusty pubescent, buds at first globose, afterwards elongate by the growth of the corolla *Calyx-lobes* 6, outer 3 triangular ovate, thick, pubescent outside, 15 in long, inner 3 imbricate, ovate-obtuse, 1 in long, margins scarious *Corolla* campanulate, tube very short, lobes 6, imbricate and twisted, 4 to 5 in long, glabrous without, slightly pubescent within *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the lobes of the corolla, ovate lanceolate, apiculate, thickly rusty-villous, filaments as long as anthers, slender, glabrous *Ovary* globose, style 5 in long, subulate, glabrous *Fruit* a globose berry, 75 to 1 in in diam, pulp fleshy, seeds 1 to 2 *Seed* ovoid, scarcely flattened on one side, pointed at base, testa thin, shining, albumen none, cotyledons fleshy *Dichopsis obovata* Clarke in Hook f Fl Br Ind iii 512 *Isomandra obovata*, Griff. Notul iv 293, Kurz

For Fl II 120 and Journ As Soc Beng XLVI ii 230 *Bassia hypoleuca*, Miq Fl Ind Bat Suppl 582 (*vide* Kurz)

PENANG *Holmberg* 783 MALACCA *Griffith* (K D ) 3606, *Mangay* (K D ) 985, 996, *Curtis* 3480, 3481, 3482, *Hervey* 2754, *Derry* 59, 88, *Ridley* 10079, *Goodenough* 1994 SINGAPORE *T Anderson* 122, *Ridley* —DISTRIB Tenasseim, Sumatra

*Curtis* says it gives a low class bastard gutta of little value. Vern 'Niato bunga' 'Niato tunbaga' 'Niato balam'

2 *PALAEQUIM MAINGAYI*, King & Gamble A tree, stems reaching 60 feet in height and 10 to 15 in in diam, branchlets dark brown, rough, about 4 in in diam, marked by the large scars of fallen leaves, innovations densely short rusty-pubescent. *Leaves* chartaceous, obovate, obtuse at apex, cuneate or slightly rounded and more or less auricled at base, margins recurved, glabrous above except on midrib, thickly ferruginous pubescent beneath, 5 to 13 in long, 3 to 7 in broad midrib stout impressed above, prominent beneath main nerves 12 to 20 pairs, 5 to 8 in apart, starting at an angle of about 55° with the midrib, parallel to near the margin and then curving upwards to join in a marginal nerve, reticulations not prominent, obliquely joining the main nerves, petiole 1 to 1.5 in long, thickly rusty pubescent, channelled above by the decurrent margins of the blade, stipules subulate falcate, 5 in long, very caducous. *Flowers* fasciculate, up to 10 together, in the axils of the leaves or of the scars of fallen leaves, pedicels 5 to 7 in long, rusty pubescent. *Calyx* lobes 6, outer 3 valvate, ovate, densely pubescent, 15 in long, inner 3 imbricate, orbicular, depressed at top, scarious and ciliate on the margins, 15 in long. *Corolla* campanulate, tube short (1 in), lobes 6 imbricate, overlapping to the right, ovate oblong, glabrous, 25 to 35 in long. *Stamens* 12, 25 in long, opposite to and alternate with corolla lobes, anthers ovate, apiculate slightly rusty hirsute behind, filaments as long as anthers, slender. *Ovary* rounded, style 2 to 4 in long, subulate, cells 6. *Fruit* a shining, green, fleshy berry, about 5 in long, supported by the persistent calyx. *Seeds* 2, oblong, testa dark brown crustaceous, albumen none. *Dichopsis Mangayi*, Clarke in Hook f Fl Br Ind III 543

PERAK *Wray* 524, 553, 2215, up to 2,000 feet, King's Collector 6644 MALACCA *Mangay* (K D ) 996/2, *Hervey*

*P. Ottolanderi* Koord & Val of Java is near this species but is readily distinguished by its larger flowers and long pointed fruit

3 *PALAEQUIM CLARKEANUM*, King & Gamble A large tree, with thick rough bark and spreading branches, reaching 100 to 150 feet in

height and 2 to 4 feet in diam of stem, branchlets stout, uppermost 5 in in diam, prominently pitted with the scars of fallen leaves, densely ferruginous tomentose. *Leaves* chartaceous, obovate, obtuse at apex, cuneate at base, glabrous above except on the midrib which is strongly pubescent, densely ferruginous tomentose beneath, margins recurved, 8 to 10 in long, 4 to 5 in broad, midrib very thick main-nerves 18 to 22 pairs, rather irregular, starting at about  $70^{\circ}$  to  $80^{\circ}$  with the midrib, straight at first then arching at and along the margin, impressed above, reticulations obliquely transverse, prominent, petiole 7 to 1 in long, thick, densely ferruginous tomentose, enlarged at base. *Flowers* not seen. *Fruit* an oblong, glossy, bright green berry, 2 in long, 1-seeded. *Seed* oblong, acute at both ends, rounded on the back, flattened at the hilum, 12 in long, 5 in broad, testa thin, chartaceous, shining, chestnut-brown, hilum oblong, cotyledons oblong, fleshy. *Dichopsis* (*larkeana*, Brace MS in Herb Cal.

**PERAK** at Waterfall Hill, 600 feet, *Wray* 530, on open hills near Larut at 500 to 1,000 feet, *King's Collector* 3796

*Wray* says the gutta it gives is not enough in quantity to be worth extraction. The tree is evidently closely allied to *I. Mungaya* and might almost be made a variety of that species.

**24 PALAQUIUM GUTTA** Buick in Ann Ind Brit V 24, t IV (1885). A large evergreen tree branchlets rough, prominently marked with the scars of fallen leaves and with longitudinal wrinkles, innovations minutely ferruginous pubescent. *Leaves* coriaceous, obovate or obovate-oblong abruptly and usually shortly acuminate at apex rarely rounded cuneate at base, margins slightly recurved, glabrous above, densely appressed golden silky pubescent beneath especially when young when old glabrescent, 3 to 5 in long, 15 to 25 in broad midrib prominent impressed above main nerves 24 to 30 pairs, indistinct starting at rather more than  $60^{\circ}$  with the midrib, parallel and arching only close to the margin, secondary nerves and reticulations inconspicuous, the latter very oblique. petiole 1 to 1.5 in long slender grooved above, slightly thickened at base, appressed golden pubescent. *Flowers* in fascicles of about 4 to 5, in the axils of the leaves or of the scars of fallen leaves on the previous year's wood pedicels thick 1 to 2 in long somewhat a densely golden pubescent. *Calyx* lobes 6, 3 outer valvate, triangular, 3 in long 3 inner imbricate, rather longer and more acute, golden pubescent without. *Corolla* rotate campanulate, tube shorter than the calyx, lobes 6 ovate, obtuse, imbricate and twisted at first, afterwards spreading, 25 in long, glabrous. *Stamens* 12, opposite to

and alternate with the corolla-lobes, inserted at the top of the tube, filaments equal, slender, 1 in long, anthers shorter than the filaments, ovate, extrorse, the connective produced in a broad point. Ovary sub-globose, slightly pubescent, 6 celled ovules oblong one in each cell, style 4 to 5 in long, filiform, stigma obtuse. Fruit a 1-2 seeded berry, 6 to 7 in in diam, ovoid, acute at top, pulp very glutinous, hard. Seeds oblong, rounded at the ends, hilum very large elliptic, occupying about one-half of the surface, testa shining. Picture in Bull Soc Linn Par I 498, Engl & Prantl Pflanzenfam IV 1 135 fig 71. Baill Hist des Pl XI fig 296. *Dichopsis Gutta*, Benth in Gen Pl II 658, Clarke in Hook f Fl Br Ind III 543. *Isonandra Gutta*, Hook Lond Journ Bot VI 463 t 16, Welp Ann 1 496, Miq Fl Ind Bat II 1038 t XXXVI, Benth & Trim Med Pl t 167.

PERANG Curtis 780 3535, 3582, 3633, 3635. PERAK Wray 522. MALACCA Mangay (K D) 983. DINDINGH Hallsfur (Curtis 3639). SINGAPORE Lobb 290. Ridley 9519, 11320.

The true guttapercha tree perhaps the most valuable of all the trees of the Peninsula. It was the Taban Gutta or Taban Merah. It has become very scarce in a wild state, but is now being much planted, so perhaps it may soon again become common (see also H C Hill Reports on Forest Conservancy in the Straits Settlements and the Federated Malay States and Burn Murdoch in 'Indian Forester' XXXI 30) 'Some facts about Gutta Percha'. Ridley in Trans Linn Soc III (1893) 317 says the tree was seen by him in several places in the Taban woods and that a considerable amount of guttapercha is collected there.

VAR *oblongifolia*. A large tree, stem reaching 80 feet in height and up to 2 feet in diam. Leaves larger than in the typical form, obovate oblong or lanceolate oblong, long, abruptly acuminate, reaching 7 in in length and 3 in in breadth, rather more conspicuously golden pubescent. Flowers similar but a little larger, pedicels a little shorter. Fruit rather larger, less acute at top. *P. oblongifolium* Burck in Ann Jard Bot Brit V 25 tab V. *Isonandra Gutta* var *oblongifolia*, de Vries, Tuinbouw Flora (1856), III 226. *Isonandra Gutta*, var  $\beta$  *sumatrana*, Miq Fl Ind Bat II 1038, and Suppl 581.

PERAK Curtis 3637, 3725, Wray 535, Minton King's Collector 6175. JOHOREL Curtis 3632—in open forest in the hills at 500 to 1,000 feet—DISIRIB Sumatra, Borneo. Gives guttapercha like the type.

We are unable to find sufficient characters for separating this as a species from *P. Gutta* as is done by Burck. The specimens available seem to point to a regular series of intermediates so that it can scarcely be even maintained as a variety. It is possible that *P. malaccense* and *P. formosum*, Pierre in Bull Soc Linn Par I 498, are both forms of *P. Gutta* but we have seen no specimens. Beccari in 'Nelle

Foreste di Borneo," p. 558, suggests the identity of the latter species with *P. oblongifolium*.

5. *PALAEQUIM OXLEYANUM*, Pierre in Bull. Soc. Linn. Par. I. 498 (1885), *non* Burck. A large tree; branchlets dark brown, marked by prominent scars of fallen leaves, innovations minutely ferruginous-pubescent. *Leaves* coriaceous; oblong-obovate, abruptly and shortly acuminate at apex, cuneately attenuate at base, glabrous above, densely appressed-golden-pubescent beneath, finally glabrate, margins recurved; 5 to 8 in. long, 2.5 to 3 in. broad, midrib prominent, thick, impressed above; main-nerves 14 to 18 pairs, irregular, sometimes branched, .4 to .5 in. apart, starting at an angle of about 60° with the midrib, curved near the margin to meet in a rather faint looped intramarginal nerve; secondary nerves few; reticulations few, horizontally transverse; petiole 1 to 1.5 in. long, somewhat thickened at base, minutely rusty-pubescent, channelled above and bordered for some distance by the decurrent margins of the blade; stipules minute, falcate, caducous. *Calyx-lobes* 6, 3 outer rather thicker than 3 inner, ovate, sub-acute, densely ferruginous-pubescent, .25 in. long. *Fruit* a nearly globose berry, 1 in. long and about .75 in. in diam. *Seeds* oblong; testa shining, crustaceous. *Dichopsis pustulata*, Hemsl. in *Herb. Kew*.

PENANG: *Curtis* 3582 PERAK *Curtis* 3631, 3638, 3724—on the hills up to 2,500 feet, *Wray* 511 (*part*), 590, *Douglas*, *Phyllips*.<sup>1</sup> SELANGOR. *Curtis* 3763, 3764. SINGAPORE. *Maingay* (K.D.) 983 No. 1948 quoted by Pierre), *Jas. Collins* (a pustulate form apparent diseased).

This species gives apparently the "taban sutra" or "taban putih" guttapercha, which is not one of the best quality

VAR *glabrata* King & Gamble. *Leaves* smaller, about 1.5 in. broad, glabrate beneath, rarely slightly golden-pubescent, *fruit* oblong, *branchlets* grey, very rough with scars of fallen leaves and flowers.

PERAK. *Wray* 511 (*part*), 518.

*P. Oxleyanum*, Burck Ann. Jard. Buit. v. (1886) 33, is a different plant altogether (see *Teysmann's* specimen in *Herb. Kew*)

6. *PALAEQUIM XANTHOCHYUM*, Pierre ex Burck in Ann. Jard. Bui' 30 (1885) A large handsome tree; the stem reaching 80 to 120 feet height and 2.5 to 3 feet in diam.; branchlets dark brown, innovations rusty-pubescent; leaf-bud scales lanceolate, ciliate, about .1 in. long. *Leaves* coriaceous, glossy-green; obovate, obtuse and often emarginate at apex, cuneate at base; glabrous on both surfaces, margin recurved, reddish when dry, 2.5 to 4 in. long, 1.5 in. broad; midrib prominent,

impressed above; main-nerves obscure, about 12 to 14 pairs at about 60° with the midrib; reticulations scarcely visible; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade, stipules ovate, ciliate, very small, caducous. *Flowers* fascicled, up to 8 together, in the axils of the leaves or of the scars below them; pedicels slender, recurved, .2 in. long; buds very small, conical. *Calyx-lobes* 6, .1 in. long, 3 outer valvate, 3 inner imbricate, ovate-acute, rusty-pubescent. *Corolla* campanulate, 3 in. long, tube short, lobes 6, imbricate, oblong, blunt. *Stamens* 12, inserted on the top of the tube; filaments stout, curved, anthers ovate-sagittate, mucronate, extrorse. *Ovary* rounded, glabrous, style .1 in. long, subulate. *Fruit* an ovoid berry, glabrous. *Isonandra xanthochyma*, de Vriese Nat. Tijdschr. Ned. Ind. XXI. 311, and Miq. Journ. Bot. Neerl. i. 259. *Dichopsis rubens*, Clarke in Hook. f. Fl. Br. Ind. III 543.

PERAK *King's Collector* 7288—on low ground and rich soil. MALACCA *Mungay* (K.D.) 995. SINGAPORE: *Cantley* 63; *Ridley* 3774. —DISTRIB. Borneo

Produces a puttapercha of a yellowish colour and second quality (de Vriese).

7. *PALAEQUIM BANCANUM*, Burck in Ann. Jard. Buit. V. 43 (1885). A very large evergreen tree, stems reaching 80 to 100 feet (Curtis), 100 to 120 feet (Kunstler) in height, with a girth of 10 to 12 feet; branchlets rough, prominently marked with the scars of fallen leaves, upper branchlets and innovations slightly but minutely rusty-pubescent. *Leaves* coriaceous, clustered at the ends of the branchlets, obovate or obovate-oblong, abruptly and very shortly acute at the otherwise rounded apex, cuneate at base; margins slightly recurved, glabrous on both surfaces, the lower with very minute glandular scales; 3 to 4 in long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves very obscure, about 14 to 16 pairs, inclined at nearly 70° to midrib and at first parallel, afterwards arching, reticulations very faint, petiole .7 to 1 in. long, edged above with the decurrent margins of the blade, glabrous. *Flowers* fasciculate, clustered about 2 to 4 together in the axils of the leaves or of the scars of fallen leaves, often on a length of as much as 4 to 5 in. of the branchlet; pedicels and calyx minutely ferruginous-pubescent; pedicels .1 to .15 in long, thick. *Calyx-lobes* 6, the 3 outer valvate rounded, the 3 inner imbricate acute, .15 to .2 in. long. *Corolla* campanulate, tube as long as calyx, lobes 6, ovate, spreading, as long as tube, glabrous except a slight rusty pubescence within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the corolla-lobes; filaments inserted on the top of the tube, slender; anthers ovate, apiculate, extrorse. *Ovary* flattened-



cylindrical, the top rusty-hirsute, style as long as corolla, subulate, glabrous, cells 6 *Fruit* a fleshy oblong or obovate berry, smooth, 75 in long, 5 in thick, 1-seeded

PENANG *Curtis* 3583, 3659 PERAK *Wray* 3984, *King's Collector* 6506, 6509 SINGAPORE *Ridley* 6019, 6134, 6502, 6507, *Fox* 11307 at Bukit Timah, *Cantley* 73 —DISTRIB Bangka

Said to give a kind of "guttapercha"

8 *PALAEQUIM RIDLEYI*, King & Gamble, n sp A tree (?), branchlets blackish grey, rough, innovations minutely rusty pubescent *Leaves* chartaceous-coriaceous, elliptic or elliptic-obovate, obtuse, emarginate or slightly acute at apex, cuneate at base, glabrous on both surfaces, margins slightly recurved, 2 to 3 in long, 1 to 2 in broad, midrib broad, main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin, 2 to 3 in apart, reticulations many, transverse, impressed above, petiole 5 to 7 in long flattened and bordered by the decurrent broad margins of the blade, stipules small, ovate, hirsute, caducous *Flowers* small, fascicled in groups of 6 or 7 together in the axils of the uppermost leaves, pedicels rather thick, about 25 in long, sparsely appressed-pubescent (*calyx lobes* 6, 1 in long, 3 outer rounded, shortly mucronate, glabrous, wrinkled when dry, 3 inner thin, scarious on the margins, ciliate, rusty pubescent on both sides *Corolla* tubular campanulate, 15 in long, glabrous, lobes 6, oblong, obtuse, arose at tip, tube as long as lobes *Stamens* 12, inserted on the top of the tube opposite to and alternate with the lobes, filaments slender as long as the lobes, anthers ovate acute *Ovary* conical glabrous below, villous above, surmounted by a conical thick style, 05 in long, 6-celled *Fruit* not seen

SINGAPORE *Ridley* 3591a

9 *PALAEQUIM MICROPHYLLUM*, King & Gamble, n sp A tree (?), branchlets rounded, rough, dotted with scars of fallen leaves and flowers, innovations dark ferruginous pubescent *Leaves* coriaceous, obovate, obtuse or slightly obtusely acute at apex, cuneate at base, glabrous on both surfaces, margins recurved, 1 to 2 in long, 7 to 1 in broad, midrib slender, impressed above, main-nerves indist about 8 to 10 pairs, nearly at right angles to the midrib, reticula very faint even when dry, petiole 4 to 5 in long, bordered above by the decurrent margins of the blade *Flowers* fascicled, 1 to 3 together, above the scars of fallen leaves on the past year's wood, pedicels 2 in long, rusty-pubescent *Calyx-lobes* 6, outer 3 valvate, ovate-acute, 15 to 2 in long, densely tawny pubescent, inner 3 imbricate, ovate,

blunt, scarious and ciliate on the margins, tawny-pubescent on the back, .1 to .15 in long *Corolla* tubular rotate, the tube very short, scarcely .05 in long, the 6 lobes oblong or nearly spathulate, 1 to 15 in long, reflexed in flower, sparsely hairy without *Stamens* 12, filaments slender, recurved, anthers ovate, .075 in long, bi mucronate *Ovary* tawny-villous, conical, style 15 to 2 in long, straight, cells 6 *Fruit* not seen.

SINGAPORE at Bukit Timah, Ridley 10840

10 *PALAQIUM HEXANDRUM*, King & Gamble A tree, branchlets light brown, innovations ferruginous pubescent *Leaves* chartaceous, glabrous, elliptic oblong, shortly and bluntly acute at apex, attenuate and more or less unequal at base, 4 to 5 in. long, 2 to 2.5 in broad, midrib thick, prominent, main nerves 10 to 13 pairs, starting at about 65° to midrib then arched upwards, reticulations obscure *Flowers* fasciculate, 3 to 4 together in the axils of the leaves or the scars of fallen leaves, pedicels slender, 4 in long, minutely pubescent *Calyx-lobes* 6, 3 outer valvate, 3 inner more or less imbricate, pubescent outside, ciliate, .05 to .07 in long, apex scarcely acute *Corolla* campanulate, tube 1 in with a ring of hairs near the mouth inside, lobes 6, imbricate, 1.5 in long, oblong obtuse, spreading *Stamens* 12, inserted on the top of the tube 6 opposite to and 6 alternate with the lobes, the alternate ones shorter, filaments slender, anthers exsert, ovate lanceolate bi mucronate, as long as filaments *Ovary* rounded, thickly rusty pubescent, style subulate, .25 in long *Fruit* a fleshy berry, about .75 in in diam, smooth, 1-seeded *Seed* ovoid, .7 in long, .5 in broad, scarcely flattened, testa thin, brown, shining, hilum very large, occupying about one half of the seed, albumen none *Dichopsis hexandra*, Clarke in Hook f Fl. Br Ind iii 513 *Isandra hexandra*, Griff Notul IV 292 *Paysonia Griffithii*, Kunz For Fl II 121, and Journ As Soc Beng XLVI n 230 (vide Clarke, but with doubt)

MALACCA Griffith (K.D) 3609, Manqay (K.D) 984 SINGAPORE Ridley 11373 —DISTRIB Burma(?)

11 *PALAQIUM HERVEYI*, King & Gamble, n sp A large tree, branchlets rather stout, dark brown, innovations minutely rusty pubescent, leaf-bud scales lanceolate, 1.5 in *Leaves* chartaceous coriaceous, elliptic or elliptic-obovate, very shortly acute or sometimes emarginate at apex, cuneately attenuate often unequally at base, glabrous above except on midrib and nerves, sparsely rusty pubescent beneath, afterwards glabrate, cinereous when dry, 2 to 3.5 in long, 1.25 to 1.75 in broad, midrib prominent, main-nerves 5 to 7 pairs at about 45° with the midrib and arching upwards, reticulations obscure, petiole .5 in long

bordered above by the decurrent margins of the blade, rusty-pubescent. *Flowers* small, fascicled 4 to 6 together in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels .3 in. long, slender, decurved, pubescent; buds very small, globose. *Calyx* 6-lobed, 3 outer valvate, and 3 inner imbricate, .1 in. long, lobes ovate acute, pubescent. *Corolla* campanulate; tube short, rusty-hirsute without; lobes 6, oblong-linear, recurved in flower, hairy within at the base, .15 in long, imbricate. *Stamens* 12; filaments long, exsert; anthers ovate, mucronate, extrorse, as long as filaments, hirsute. *Ovary* subglobose, rusty-pubescent, 6-celled; style slender, .3 in long; stigma capitate. *Fruit* not seen.

PERAK: Wray 1104. MALACCA: Maingay (K.D.) 995, *Scortechini* 1892; Hervey. Vern. "Jongek" (Hervey).

Wray says the gutta is sticky and worthless.

12. *PALAEQUIM STELLATUM*, King & Gamble. A large tree, stems reaching over 100 feet in height; branchlets rather thick, dark brown, rough with the scars of fallen leaves; innovations ferruginous-pubescent. *Leaves* membrano-chartaceous, clustered at the ends of the branchlets; oblong-lanceolate, shortly acuminate at apex, cuneate at base; nearly glabrous above, pale and when young tomentose beneath, rusty-stellate-tomentose (*Scortechini*) on the nerves on both sides; 3 to 6 in. long, 1 to 1.5 in broad, midrib prominent, main-nerves 10 pairs, starting at about 60° with the midrib and at once curving upwards; reticulations prominent on both sides in an elegant network; petiole .75 to 1 in long, slender, densely rusty-pubescent. *Flowers* fasciculate, 3 to 5 together in the axils of the upper leaves, forming almost a terminal leafy corymb of about 20 to 25 flowers; pedicels slender, about 1 in. long, densely rusty-pubescent. *Calyx-lobes* 6, densely rusty-pubescent, in 2 series, the outer of 3 valvate, ovate, rounded lobes, the inner of 3 ovate ciliate lobes with scarious margins, both .25 to .3 in long. *Corolla* campanulate, 3 to 4 in. long, the tube a little shorter than the lobes; the lobes imbricate, twisted in bud, rounded at top, glabrous. *Stamens* 12 in one series, filaments on the base of the tube and attached to it, free above, .2 in. long, thickened below, slender above; anthers oblong-lanceolate, apiculate, extrorse, .1 in. long, glabrous. *Ovary* rusty-pubescent, sub-globose; style slender, .35 in long, cells 6 (?). *Fruit* not seen. *Dichopsis stellata*, *Scortechini* MS. in Herb Calc

PERAK: *Scortechini*, 1855.

A very distinct species, looking very like a *Bassia*. *Scortechini* says it yields good gutta, but in small quantities.

8. *Mimusops*, Linn.

Trees with milky juice. *Leaves* chartaceous or coriaceous, with many usually inconspicuous parallel main-nerves. *Flowers* solitary or fascicled in the axils of the upper leaves on the branchlets. *Calyx-lobes* 6 or 8, in 2 series, the outer valvate enclosing the inner imbricate. *Corolla* with short tube; lobes 18 or 24 or more in 2 rows, one-third of the number in the inner, the rest in the outer, row, lobes of the outer row often divided. *Stamens* 6 or 8, attached to the corolla-tube opposite the inner lobes; filaments short, dilated, free or connate in a tube with the staminodes; anthers lanceolate, extrorse, usually apiculate by the production of the connective. *Staminodes* alternate with and as many as the stamens, sub-petaloid, usually fimbriate. *Ovary* hirsute, 6-8-celled. *Fruit* a globose or ovate fleshy berry, epicarp crustaceous, seeds few or solitary. *Seeds* ovate or oblong, often oblique, slightly compressed, hilum basal or lateral, testa hard, shining; albumen fleshy, thin, cotyledons flat, leafy.—*DISTRIB.* Species about 30; in the tropics of both hemispheres.

<i>Calyx</i> -segments 8; stamens 8; staminodes acuminate, hairy	.. 1. <i>M. Elengi</i> .
<i>Calyx</i> -segments 6; stamens 6; staminodes fimbriate, glabrous	.. 2. <i>M. Kauki</i> .

1. *MIMUSOPS ELENGI*, Linn Sp. Pl. 349 (1753). An evergreen tree, stems reaching 40 to 50 feet in height, and with a large girth, ultimate branchlets with dark brown rusty pubescence. *Leaves* chartaceous; elliptic, shortly acuminate at apex, rounded (often unequally), at base, glabrous on both surfaces, shining above; margins slightly recurved; 3 to 5 in long, 1.5 to 2.5 in. broad; midrib prominent, raised on both surfaces; main-nerves numerous, the first pair from the base forming intra-marginal nerves, which are looped where they meet the 14 to 16 pairs of main-nerves; secondary nerves like the main-nerves and, with the reticulations, forming an elegant network; petiole .6 to 1 in long, slender, stipules triangular-subulate, very small, ferruginous-pubescent, very caducous. *Flowers* white, fragrant, solitary or in fascicles of 2 to 6 in the axils of the upper leaves; pedicels .3 to .7 in. long, often deflexed, appressed-ferruginous-pubescent, buds ovoid, acute. *Calyx-lobes* 8, .3 in. long, ovate-lanceolate, acuminate, the 4 outer valvate, broader than the 4 inner imbricate and channelled on the back, all rusty-pubescent without, glabrous within. *Corolla* with a very short tube, scarcely over .05 in. long; lobes 24, in 2 rows, the 16 outer linear-lanceolate, the 8 inner rather broader and shorter, linear-oblong. *Stamens* 8,

\* The outer corolla-lobes are now usually considered to be of the character of stipules to the inner row which constitute the regular petals.

opposite the lobes of the inner row, filaments slender, 0.5 in long, anthers oblong, glabrous, apiculate. *Staminodes* alternate with the anthers, oblong lanceolate, acuminate, toothed, clothed on the back and sides with pale stiff hairs. *Ovary* silky pubescent, 6 celled, style slender, grooved, as long as corolla. *Fruit* an ovoid berry about 1 in long, yellow when ripe, 1 rarely 2-seeded. *Seed* oblong, 7.5 in long, 5 broad and about 2.5 thick, rounded above, hollowed at base where is the small oval hilum, testa crustaceous, dark brown, shining, albumen thin, cotyledons oblong, leafy, nearly as large as the seed cavity, radicle inferior. Roxb Cor Pl I. 15 t 14, and Fl Ind II 236, Gaertn f Fruct I 198, t 42, Lamk Ill t 300, Baillon Hist Pl XI 267, figs 302-309, Engl & Prantl Pflanzenfam IV 1 152, fig 82 E-J, Burck Ann Jard Bot V (1886) 61, Wall Cat 4146, A DC Prod VIII 202, Clarke in Hook f Fl Br Ind III 548, Dalz & Gibs Bomb Fl 140, Wight Ic t 1586, Brandis For Fl 293, Bedd Fl Sylv t 40, Kurz in Journ As Soc. Beng XLVI 11 231, For Fl II 123, Trimen Fl Ceyl III. 86, Prain Beng Fl 649, Cooke Fl Bomb II 95. *M. obtusifolia*, Bl Bijdr 672. "*Elengi*" Rheede Hort Mal I 33 t 20. Rumph Herb Amb II 189 t 63.

PERAK *Scortechium* 1122 MALACCA *Griffith* (K D) 3612, *Manngay* (K D) 995/2, 998, *Cunning* 2265 —DISTRIB India, Ceylon, Burma, cultivated in other tropical regions, the fallen corollas are used to make garlands.

2 *MIMUSOPS KAUKI*, Linn Sp Pl 349 (1753) A large evergreen tree, branchlets thick greyish brown, extremities somewhat ferruginous scaly or pubescent. *Leaves* coriaceous, clustered towards the ends of the branchlets, obovate or obovate-oblong, obtuse, emarginate or very slightly acute at apex, cuneate at base, glabrous above, densely and smoothly grey silky pubescent beneath, the margins slightly recurved, 2 to 4 in long, 1.25 to 2.75 in broad midrib prominent, main nerves very indistinct, about 14 to 16 pairs, parallel, meeting near the edge in a looped intramarginal nerve, petiole 5 to 1.5 in long, moderately thick, channelled above. *Flowers* thickly clustered towards the ends of the branchlets, pedicels 7.5 to 1 in long, appressed grey silky-pubescent, angular. *Calyx lobes* 6, 2.5 in long, 3 outer valvate, ovate, acute, grey silky pubescent, 3 inner imbricate, similar but rather thinner. *Corolla* with a very short tube and 18 (or more, exceptions) lobes in 2 rows, the outer row 12, lanceolate, acute, the inner 6, spatulate, all 1 in long or nearly so, glabrous. *Stamens* 6 to 8, usually 6, exserted, filaments 1 in long conical, glabrous, anthers 1 in long, linear, blunt. *Staminodes* alternating with the stamens, 2 to 2.5 in long, cuneate, deeply and irregularly fimbriate at apex

*Ovary* villous, ovoid, 6-celled; ovules elliptic; style exsert, .4 in. long, slender. *Fruit* an ovoid rough berry, .1 in. long, 2-4-seeded. *Seeds* obliquely obovoid, somewhat curved near the base, .6 to .7 in. long by .4 to .5 in. broad and .4 in. thick; hilum lateral towards the base, .35 in. long, linear-oblong; testa thick, crustaceous, chestnut-brown; albumen thin; cotyledons flat, leafy, oblong, .3 to .35 in. long; radicle inferior, rather large Wall. Cat. 4149 (upper half); A. DC. Prod. VIII. 203; Clarke in Hook f. Fl. Br. Ind. III. 549, Miq. Fl. Ind. Bat. II. 1042; Koord. & Val. Bijdr. I. 156; Burek in Ann. Jard. Buit. V. (1886) 64 *M. Balata*, Gaertn. f. Fruct. III. 133 *M. Balota*, Bl. Bijdr. 673. *M. Hookeri*, A. DC. Prod. VIII. 204. *M. Bojeri*, A. DC. l c. 205 (fide Miquel). *M. dissecta*, R. Br. Prod. 531. *M. Browniana*, Benth. Fl. Austral. IV. 285.—Rumph. Herb. Amb. iii. 19 t. 8 *flor. exc.*

PERAK *Scortechini*. MALACCA: Griffith (K.D.) 3614; Maingay (K.D.) 987.—DISTRIB. Amherst in Burma, Wallich; Malay Islands, tropical Australia—cultivated elsewhere for its edible fruit

The following new species from the Andaman Islands seems worthy of description here

*MIMUSOPS ANDAMANENSIS*, King & Gamble, n. sp. A tree (?); branchlets slender, grey, innovations, with inflorescence and leaf-petioles, covered with appressed pale tawny tomentum. *Leaves* coriaceous, elliptic-obovate, shortly acute at apex, cuneate at base; margins recurved; glabrous on both surfaces; 3 to 4 in. long, 2 to 3 in. broad; midrib slender, main nerves about 15 pairs, parallel, very inconspicuous, secondary nerves similar to main nerves, less prominent, petiole slender, .75 to 1 in. long, channelled above. *Inflorescence* of 1-3 flowered sessile umbels in the axils of the upper leaves, pedicels slender, 8 to 1 in. long, angular; buds ovoid conical .4 in. long. *Calyx-lobes* 8 in 2 series, outer 4 lanceolate, acuminate, valvate, reflexed when open, 4 to 5 in. long, inner 4 as long, linear-lanceolate, deeply channelled on the back, scarcely imbricate. *Corolla-lobes* 24, the inner series of 8, oblong-lanceolate, glabrous, obtuse, each bearing behind it two narrow acute, simple or deeply bifid lobes, rather shorter than and narrower than the 8 inner lobes. *Stamens* 8, opposite the inner corolla-lobes, and shorter than them; filaments slender, slightly hirsute, .075 in. long, anthers linear-sagittate, the connective produced in a long apiculus, often bifid. *Staminodes* alternate with the stamens and rather shorter than them, densely hirsute, linear-lanceolate, long acuminate, midrib black. *Ovary* rounded, 8 lobed, pubescent; style subulate, glabrous, stigma minutely cleft; cells 8, each with a narrow central ovule. *Fruit* unknown

Hill jungle near Port Mouat, S. Andaman, King's Collector

In the characters of the corolla-lobes this species seems to be intermediate between *Mimusops* and *Imbricaria*, and, since Engler has recently reduced *Imbricaria* to a section of *Mimusops*, we have no hesitation in describing it under that genus.

two in each fascicle on a short densely hairy pedicel, rotate, .3 or .4 in. in diam. *Calyx* very coriaceous, divided to the base into 3 spreading broadly ovate lobes with broad blunt apices and concave bases, partly adpressed-pilose and partly glabrescent. *Corolla* smaller and less coriaceous than the calyx, tubular, glabrous, its lobes ovate-elliptic. *Male flowers* with 6 stamens in 2 rows, 3 of them small; anthers cordate, filaments flat; rudimentary ovary ovoid, apiculate, with a dense ring of coarse hair at its base. *Female flowers* with a few flat staminodes, the ovary broadly ovoid apiculate, hirsute in its lower part; styles 3, glabrous, distinct, the stigmas broad. *Fruit* ovoid-globular, glabrous, .75 in. long and .6 in. in diam., blunt at apex and base, the latter subtended by the 3- sometimes 4-lobed, thick, almost woody, accrescent calyx, its lobes spreading, their edges reflexed. *Seeds* elliptic, plano-convex. *Diospyros venosa*, Wall Cat. 4126.

SINGAPORE: *Ridley* 4961; *King's Collector* 3495, 3862, 7643.

3. *MABA OLIVACEA*, King & Gamble, n sp. A tree 50 to 70 feet high, young branches half as thick as a goose-quill, puberulous, pale cinereous when dry. *Leaves* coriaceous, alternate; elliptic, shortly and abruptly apiculate, the base rounded or cuneate, the edges much recurved when dry; upper surface olivaceous, shining, glabrous except the depressed rusty-puberulous midrib, lower surface softly velvety-pubescent, olivaceous, the hair on the bold midrib and 5 to 8 pairs of curved spreading rather prominent main-nerves rusty; length 3 to 5.5 in., breadth 1.5 to 2.25 in., petiole .4 in., tomentose. *Male flowers* sessile, .15 in. long, in branched condensed axillary and extra-axillary cymes less than 1 in. long, bracteoles broad, blunt, small. *Calyx* 1 in. long, tubular-campanulate, tomentose outside, glabrous inside, divided nearly to the base into 4 broadly ovate obtuse erect lobes. *Corolla* cylindric-campanulate, glabrous except the hairy edges of the 4 oblong lobes. *Stamens* 8 large and 4 small, lanceolate, on short filaments. *Female flowers* not seen. *Fruit* ellipsoid, blunt at each end, the apex crowned by the short style, glabrous, about .5 in. long, and .4 in. in diam. *Calyx* at the base of the fruit thick, spreading, .6 in. across, with 4 ovate, blunt lobes with reflexed edges.

PERAK: *King's Collector* 7877, *Wray* 1269. LANKAWI: *Curtis* 1661

4. *MABA MERGUENSIS*, Hiern in Trans Camb. Phil. Soc. XII. 134 (1873) A small, nearly glabrous tree, young branches thicker than a crow-quill. *Leaves* alternate, thinly coriaceous, ovate or elliptic, shortly and obtusely acuminate, the base cuneate or rounded; main-nerves 3 to 5 pairs, slightly curved, ascending, length 3 to 5.5 in.; breadth 1.65 to 2.65 in.; petiole about .25 in. long. *Male flowers* in dense minutely

pubescent branching axillary cymes only 1 to 1·5 in in diam *Calyx* less than ·25 in. long, with 3 or 4 obtuse triangular lobes. *Corolla* slightly larger than the calyx, shortly 3- or 4-lobed *Stamens* 14 to 16, glabrous; rudimentary ovary minute *Female flowers* 3- or 4-merous. *Calyx* lobed half-way down. *Corolla* 3- or 4-merous, *Staminodes* 3 or 4. *Ovary-cells* 6, 1-ovulate *Styles* 3, distant, glabrous. *Fruit* sub-globular; its calyx 5 in in diam with 3 ovate acute spreading lobes. Kurz in Journ As Soc XLVI, ii. 232, and For. Fl. II. 139; Clarke in Hook f Fl. Br Ind III 552

PENANG *Helper* (K D ) 3618, *Curtis* 705, 718 —DISTRIB. Burma  
Very imperfectly represented in Herbaria

5 *MABA CLARKEANA*, King & Gamble, n. sp A tree 20 to 30 feet high, young branches twice as thick as a crow-quill, puberulous when young, ultimately glabrous, cinereous with small black striæ *Leaves* alternate, coriaceous, oblong, the apex blunt and sometimes minutely notched, the base cuneate, upper surface olivaceous, glabrous, shining when dry, lower surface dull, paler, sparsely and deciduously adpressed-pubescent and the minute reticulations rather distinct, main-nerves 6 or 7 pairs, spreading, very faint on both surfaces; midrib bold in the lower, depressed on the upper surface, length 1·5 to 3 in., breadth ·65 to 1·25 in., petioles 1 in long *Male flowers* small (only ·1 to 15 in long), crowded in sessile cymes ·25 to ·5 in. long, in the axils of the upper leaves, with a few oblong bracteoles. *Calyx* sessile or subsessile, adpressed-pubescent outside, glabrous inside, divided half-way down into 3 sub-erect broadly ovate acute lobes. *Corolla* smaller than the calyx, densely sericeous outside, glabrous inside, divided to the base into 3 ovate-lanceolate, with an inner row of 3 or 6 similar but narrower, lobes *Stamens* 6, in pairs, joined by the bases of their broad filaments, anthers lanceolate. *Female flower* unknown *Fruit* globular, ·35 in. in diam., glabrous. *Calyx* at its base thick, with 3 obtuse angles. *Seeds* 3, 3-sided, ·25 in. long

PERAK *King's Collector* 4816.

6. *MABA PERAKENSIS*, King & Gamble, n sp A tree 50 to 60 feet high; young branches as thick as a crow-quill, minutely puberulous becoming glabrous, dark-coloured, sub-glaucous *Leaves* coriaceous, alternate; rather broadly oblong to oblong-lanceolate, the apex acute, the base broad and rounded or slightly cuneate; both surfaces dark olivaceous, the upper shining, the lower dull, main-nerves obsolete, midrib minutely pubescent, prominent on the lower surface, depressed on the upper; length 2·5 to 3 in., breadth ·75 to 1·35 in.; petioles



·15 in. long. *Male flowers* about ·15 in. long, 8 or 10 together in dense sessile axillary clusters not much exceeding the petioles. *Calyx* sessile or nearly so, campanulate, slightly pubescent outside, glabrous inside, deeply divided into 3 broadly ovate acute lobes. *Corolla* tubular; adpressed-sericeous externally, glabrous inside, cut half-way down into 3 ovate acute lobes. *Stamens* 12, 6 of them united by the bases of their filaments; anthers of all lanceolate apiculate, their bases cordate. *Female flower* not known. *Fruit* obliquely ellipsoid, the apex shortly apiculate, glabrous; the calyx at the base sub-ligneous, flat, deeply divided into 3 broad ovate-rotund lobes with reflexed edges and blunt tips. *Seeds* 2, oblong

PERAK: Wray 3130, *King's Collector* 3945, 5519.

7. *MABA BUXIFOLIA*, Pers. Syn. II. (1807) 606. A bush or small tree; young branches puberulous at first, ultimately glabrous. *Leaves* small, alternate, coriaceous, varying from elliptic to obovate, the apex sub-acute or obtuse, the base always narrowed; upper surface olivaceous, the lower brown; the midrib bold, reticulations rather distinct on the upper surface only; main-nerves 4 to 6 pairs, spreading, slightly prominent on the upper surface, indistinct on the lower, edges slightly recurved; length ·35 to 1 in., breadth ·3 to ·6 in.; larger in the varieties, petiole less than ·5 in. *Flowers* solitary, or 2 to 3 in short cymes, 3-merous. *Calyx* 1 in. long, campanulate, with short triangular lobes. *Corolla* campanulate with short triangular lobes. *Male flowers*: *stamens* 6 to 12, glabrous, rudimentary ovary hairy. *Female flower*: *stamens* none, *ovary* 3-celled, style at the apex 3-lobed. *Fruit* globose or ellipsoid, 35 in long, 1-seeded. *Calyx* at its base cupular, often very short, albumen equable. Wight Ic t 763, A DC Prod VIII 240, Thwaites Enum. Pl Ceyl. 183, Trimen Fl. Ceyl III 89, Hiern in Trans. Camb Phil. Soc XII. 116, Kurz For. Fl. II. 139; Clarke in Hook f. Fl. Br. Ind III 551. *M. littorea*, Br. Prod 527. *M. Cumingiana*, *M. madagascariensis*, *M. guineensis*, *M. Smithiana*, A DC. l c. 241. *M. neilgherrensis*, Wight Ill. t 148 bis. E. *M. Ebenus*, Wight Ic. tt. 1288-9 (not of Spreng.). *Maba*? Wall. Cat 7461. *Ferreola buxifolia*, Roxb. Cor. Pl I 35, t 45, and Fl. Ind III 790.

MALACCA: *Marngay* (K.D.) 979, *Griffith* (K.D.) 3641. LANGKAWI: *Curtis* 2557. PENANG: *Curtis* 708.—DISTRIB. Malay Archipelago, Br. India, N. Australia, Philippines, tropical Africa.

A variable species, of which two varieties are recognised by Mr C B Clarke in Hooke's "Flora of British India." Both these have leaves longer than as above described, but neither occurs in our region.

## 2. DIOSPYROS, Linn.

Trees, rarely shrubs. *Leaves* alternate or rarely sub opposite, entire. *Flowers* dioecious, very rarely polygamous, axillary and short pedicelled, or in small cymes, the ♀ often, and the ♂ sometimes, solitary, usually 4- or 5 merous, rarely 3 merous. *Calyx* usually deeply-lobed, rarely truncate, often in the ♀ larger than in the ♂ and often accrescent and plicate or auriculate in fruit. *Corolla* tubular with short deep lobes, or salver shaped, or campanulate the lobes contorted to the right in bud. *Stamens* in the ♂ *flowers* 4 to 64, often 16, their filaments distinct, paired or polyadelphous, anthers linear, rarely short, *ovary* rudimentary. In the ♀ *flowers*, *staminodes* 0 to 16, *ovary* 4-5-celled or imperfectly 8-10 celled, the cells usually with 1, rarely with 2 ovules, styles or stigmas 1 to 4. *Fruit* a globose ellipsoid or ovoid-conic, berry, usually subtended by the enlarged (sometimes woody) calyx, flesh pulpy or viscid. *Seed* oblong, usually compressed, albumen equable or (rarely) ruminant. — **DISTRIB** About 220 species chiefly in the tropics

Leaves membranous or thinly coriaceous, glabrous or hairy, ♂ flowers in small cymes or fascicles 4-5 merous, stamens usually 8, 12, or 16. flowers sub solitary, ♀ calyx longer than that of the ♂ not accrescent or but slightly so, in fruit —

Leaves under 5 in long —

Fruit lobular glabrous stamens 16

1 *D. Wrayi*

Fruit cylindric or oblong conical, glabrous, stamens about 16 leaves 1 to 1.4 in long, and under .65 in broad

3 *D. microphylla*

Fruit ellipsoid —

Stamens 8 —

Fruit puberulous —

Leaves usually under 2.25 in long lanceolate sub rhomboidal

2 *D. subrhomboides*

Leaves usually over 2.25 in long elliptic oblong

6 *D. Senteana*

Fruit glabrous leaves 2.5 to 4.5 in long

5 *D. graciliflora*

Stamens 12, leaves 3.25 to 5 in long, fruit glabrous

7 *D. fluviatilis*

Fruit not known, stamens 12, leaves under 2 in long

4 *D. dumosa*

Leaves over 5 in long, fruit ovoid conic, rusty setose, stamens 6 to 12

8 *D. apiculata*

Leaves coriaceous, upper surface glabrous and shining, flowers mostly 4 merous, a few 5 merous, ♂ flowers in small cymes or clusters, calyx deeply lobed, often larger in the ♀ and differing in shape from that of the ♂ —

Calyx 4 lobed

Leaves under 5 in long —

Leaves under 1.5 in broad —

Calyx of ♀ flower densely sericeous pubescent, lobes reniform, fruit ovoid or sub globose rusty villous, its calyx 1 in in diam

9 *D. lanceolata*

- Calyx margins of ♀ flower tomentose, lobes broadly ovate, fruit globose, ultimately glabrous, 75 in long 14 *D lucida*
- Leaves 15 to 25 in broad —
- Stamens about 12, main nerves of leaves 8 to 9 pairs 10 *D pachyphylla*
- Stamens about 16, main nerves of leaves 6 to 7 pairs 11 *D clavigera*
- Stamens 16, in pairs, main nerves of leaves 5 pairs 13 *D styraciformis*
- Leaves usually more than 5 and less than 75 in long,
- Leaves under 65 in long, over 25 in broad, fruit olive shaped nearly 2 in long and 1.25 in diam 12 *D bilocularis*
- Leaves under 25 in broad —
- Leaves under 65 in long main nerves of leaves not visible, probably many pairs, fruit depressed globose 1.85 in in diam persistent calyx thick, woody 25 *D oleyfolia*
- Leaves under 75 in long, main nerves 5 to 8 pairs, fruit ellipsoid 1 in in diam persistent calyx with large membranous lobes 27 *D paniculata*
- Leaves usually more than 6 and less than 12 in long —
- Leaves beneath covered with appressed sericeous hair, stamens 20 to 24, main nerves of leaves not visible 21 *D argentea*
- Leaves beneath glabrous except the midrib, which is covered with dark hair main nerves of leaves 7 to 8 pairs fruit glabrous 17 *D tristis*
- Leaves beneath glabrous or only minutely puberulous —
- Leaves usually 3 to 3.5 in broad —
- Main nerves of leaves 8 to 10 pairs apex caudate acuminate base cuneate 18 *D pauciflora*
- Main nerves of leaves 10 to 12 pairs apex acute base rounded 19 *D ellipsoidea*
- Leaves reaching 4 in broad, fruit glabrescent
- Main nerves of leaves 8 to 14 pairs apex sub acute 23 *D Horsfieldii*
- Main nerves of leaves 16 to 20 pairs, apex shortly acuminate 24 *D toponoide*
- Leaves 3.5 to 4.5 in broad, main nerves of leaves 8 to 12 pairs, apex acute fruit densely rusty tomentose ridged 28 *D kunstleri*
- Leaves 4 to 14 in long 2.5 to 5 in broad main nerves 14 to 18 pairs, fruit sub globose 1 in in diam immersed in the thickened calyx 20 *D Wallachii*
- Leaves 10 to 18 in long 2 to 4 in broad, main nerves 14 to 20 pairs fruit depressed globose, 2 in in diam, seated on a cupular calyx 22 *D rigida*
- Calyx 5 lobed
- Leaves glabrous beneath 7 to 9 in long 3 to 3.75 in broad main nerves 16 to 18 pairs 15 *D oblonga*
- Leaves puberulous on the midrib and main nerves beneath 5.5 to 7.5 in long 2.5 to 3.25 in broad main nerves 10 to 12 pairs 16 *D Helferii*
- Leaves glabrous beneath 5.5 to 9 in long, 1.5 to 2.5 in broad, main nerves 10 to 12 pairs 26 *D brachiata*
- Leaves thinly coriaceous glabrous above puberulous beneath both ♂ and ♀, flowers in few flowered cymes on long slender extra axillary peduncles pendulous calyx 5 lobed not accrescent in fruit 29 *D nutans*

SPECIES IMPERFECTLY KNOWN

Calyx of fruit long woody its lobes pointed and much reflexed leaves glabrous	30	<i>D. reflexa</i>
Leaves oblong, hairy beneath cordate at the base Calyx in fruit small Fruit globular rusty pubescent	31	<i>D. pumilana</i>
Leaves quite glabrous elliptic narrowed at each end not cordate Fruit globular with small calyx	32	<i>D. rupe</i>
Leaves coriaceous quite glabrous oblong, arcular reticulate Male flowers in terminal tomentose cymes	33	<i>D. violata</i>
Leaves membranous oblong or oblong, elliptic glabrous 1 male flowers in fascicles of about 3 Calyx with reniform lobes pedicels bracteolate Corolla salver shaped	34	<i>D. Curtisii</i>
Leaves membranous pubescent beneath Male flowers in dense short hairy glomeruli Stamens 8	35	<i>D. glomerulata</i>
Leaves pubescent beneath Calyx lobes 4 stamens 16	36	<i>D. alpinosa</i>

1 *Diospyros* WRAY King & Gamble, n sp. A shrub 4 to 12 feet high, young branches as thick as a crow quill cinereous or rusty puberulous. Leaves small, alternate, membranous, ovate lanceolate to narrowly elliptic, shortly acuminate, the base cuneate, both surfaces dark olivaceous, the upper very shining and minutely reticulate, glabrous except the puberulous depressed midrib, the lower more brown and dull the midrib pubescent and prominent the reticulations less distinct, length 2 to 4 in breadth 75 to 15 in, petioles 05 to 1 in. Male flowers 25 in long 2 to 4 together in small axillary cymes, black when dry, puberulous, pedicels very short. Calyx less than 1 in long, narrowly campanulate with 4 deep ovate lobes. Corolla three times as long as the calyx, salver shaped, sub glabrous, limb with 4 oblong lobes. Stamens 16, united in pairs by the bases of the unequal filaments, broadly lanceolate inserted near the base of the tube. Female flowers like the ♂ but longer—especially the calyx. Staminate about 3, lanceolate. Ovary glabrescent, ovoid conic, tapering into a rather long style, stigma 4, fleshy, short. Fruit globular, crowned by the short style, glabrous, shining, black when ripe (when dry) calyx at its base 75 in across, coriaceous, deeply divided into 4 oblong blunt or sub acute reflexed lobes.

PRANK *Scortechini*, Wray 2764, 3272, 3955, King's Collector 2076 2993

2 *Diospyros* SUB RHOMBOIDEA, King & Gamble, n sp. A shrub 4 to 6 feet high young branches thinner than a crow quill, softly tawny pubescent, pale brown when dry. Leaves small, alternate lanceolate or ovate lanceolate or sub rhomboidal, bluntly acuminate the base cuneate, both surfaces olivaceous brown when dry, the upper dark, glabrous except the puberulous midrib, the lower sparsely adpressed pubescent especially on the bold midrib, main

nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.5 to 2.25 in., breadth .6 to .8 in.; petiole about .1 in. *Male flower* .6 in. long, solitary, axillary on a short tomentose pedicel with 2 broad bracteoles. *Calyx* less than .1 in. long, pubescent outside, glabrous inside, deeply divided into 4 broad obtuse almost quadrate imbricate lobes. *Corolla* salver-shaped; the tube cylindric, tapering to the apex, tomentose outside; limb as long as the tube but less hairy outside, glabrous inside like the tube, deeply divided into 4 oblong sub-acute lobes with inflexed edges, twisted to the right in bud. *Stamens* 8, attached near the bottom of the tube, 4 shorter than the others; anthers all lanceolate, and on short filaments. *Female flower* not known. *Fruit* ellipsoid, sparsely adpressed-puberulous, crowned by the conic style, .8 or .9 in. long and 4 in. in diam. *Calyx* at its base .25 in. across, flat, with 4 spreading, broad, blunt lobes.

PERAK: *Wray* 4055; *King's Collector* 7302 —DISTRIB. Sumatra, *Forbes* 2004.

3. DIOSPYROS MICROPHYLLA, Bedd. Ic. Pl. Ind. Or. 27, t. cxxxiii. (1874), and Fl. Sylv. Madr. cxlv. A tree 20 to 30 feet high; young branches as thick as a crow-quill or thinner, densely pubescent. *Leaves* thinly coriaceous, alternate, distichous, ovate-lanceolate, sub-rhomboid, the apex sub-acute, the base cuneate, upper surface dark olivaceous-brown, glabrous except the pubescent depressed midrib, the lower dark brown, puberulous, the midrib pubescent; main-nerves obsolete on both surfaces, length 1 to 1.4 in., breadth .45 to .65 in., petiole .05; the largest leaves towards the ends of the branches. *Male flowers* solitary or 3 together in a minute cyme. *Calyx* .05 long, deeply 4-lobed, tube glabrate. *Corolla* slightly longer than the calyx with 4 rounded lobes. *Stamens* about 16. *Female flowers* .2 in. long, axillary, solitary, pedicellate or in a pair on a short peduncle. *Calyx* campanulate, deeply divided into 4 sub-rotund imbricate very obtuse lobes, sericeous on the middle outside and on the edges, otherwise glabrous. *Corolla* salver-shaped, somewhat longer than the calyx, deeply cut into 4 unequal rotund lobes, adpressed-puberulous on the back of the lobes, otherwise glabrous. *Ovary* ovoid, sericeous near the apex and base; style thick, 2-fid, stigmas 4. *Ovary* 4-celled, ellipsoid, conic, 4-celled, cells 1-ovuled. *Fruit* cylindric or oblong-conical, dry, glabrous, 1-celled, 1- rarely 2-seeded, .75 to 1 in. long. *Clarke* in Hook fil Fl. Br. Ind. III. 559. *D. burxifolia*, Hiern in Trans Camb Phil. Soc. XII. 218. *D. vaccinioides*, Wall. Cat 4130 (in part) *Leucorylum burxifolium*, Blume Bijdr. 1169, Miq. Fl. Ind. Bat. II. 1050; Choisy Mem. Ternstr 43 t. 2.

MALACCA *Giffith* (K.D.) 3613, *Walker* 170, *Mangay* (K.D.) 966. SINGAPORE. *Rudley* 6045. PENANG: *Curtis* 1513, 7175. PERAK:

*Scortechini* 2052 —DISTRIB Andaman Islands, South India, Malay Archipelago

4 *DIOSPYROS DUMOSA*, King & Gamble, n sp A small tree, young branches as thick as a crow quill, glabrous, dark coloured when dry *Leaves* small alternate, membranous lincolate shortly acuminate, the base cuneate, upper surface dark olivaceous when dry, glabrous, lower yellowish, slightly puberulous on the slightly prominent midrib and 4 or 5 pairs of curved ascending nerves length 1.5 to 2 in, breadth .5 to .75 in, petiole .05 in *Male flowers* .5 in long, in small axillary sessile fascicles of 3 or 4 *Calyx* .25 in long deeply divided into 3 or 4 ovate lanceolate acuminate lobes, concave along the midrib and with undulate edges, pubescent *Corolla* twice as long as the calyx, narrowly tubular, deeply divided into 4 narrow oblong glabrous lobes, the tube pubescent inside and outside *Stamens* 12, inserted at its base on unequal slender filaments, anthers broadly lanceolate much apiculate *Female flowers* solitary, axillary, shortly pedicellate, .4 in long *Calyx* cleft to the base into 4 large broadly ovate reniform bluntly acuminate undulate lobes, sparsely adpressed pubescent on both surfaces, .25 in long and as much across *Corolla* a little longer but less hairy than the calyx, fleshy, tubular tetragonus divided for half its length into 4 narrow oblong lobes *Staminodes* 8, linear lanceolate, apiculate, on slender filaments *Ovary* narrowly ellipsoid tapering to the rather long style glabrous *Fruit* unknown

PERAK *Wray* 3508 JUNKSFTON (Tongka) *Curtis* 2907

5 *DIOSPYROS GRACILIFLORA*, Hiern in Trans Camb Phil Soc XII 191 (1873) A glabrous tree 40 to 50 feet high young branches less than half as thick as a goose quill, deciduously puberulous, dark coloured and striate when dry *Leaves* thickly membranous, alternate rather narrowly elliptic, shortly and bluntly apiculate to ciliate acuminate, the base much narrowed and often slightly oblique both surfaces dull dark olivaceous brown when dry, glabrous except for some minute hairs on the nerves beneath, main nerves about 5 pairs curved, ascending depressed or obscure on the upper surface pale and slightly prominent on the lower like the midrib, length 2.5 to 4.5 in breadth .75 to 1.35, petioles 1 to 2 in *Male flowers* .5 in long, few together, in small axillary cymes about as long as the petioles, sessile puberulous *Calyx* large two thirds to one half the length of the corolla but much wider, deeply divided into 4 large ovate rotund undulate semi erect lobes *Corolla* narrowly tubular one third to one half longer than the calyx, the tube externally with 4 lines of pubescence otherwise glabrescent, limb with 4 deeply oblong broad blunt glabrous spreading sub undulate lobes *Stamens* 8, in two rows,

4 of them smaller than the other 4, anthers linear-lanceolate, apiculate, the filaments flat, very short, rudimentary ovary small, narrowly ovate, glabrous *Female flowers* like the ♂ and often mixed with them, but sometimes solitary *Ovary* broadly ovoid, with short style, glabrous *Fruit* ellipsoid, 1 in long and 75 in in diam, glabrous, crowned by the short remains of the style, and subtended by the calyx with 4 spreading, undulate, sub glabrous lobes *D flavicans*, Hiern in Trans Camb Phil Soc XII 205 (as to female plant partly) *D decipiens*, Clarke in Hook fil Fl Br Ind III 563

MALACCA *Mangay* (K D) 972 (♀ only) PIRAK *Scortechini* 181, 198, Wray 1298, 2843, 3214, 4227, King's Collector 884, 3298, 3354, 3366, 3588, 3394, 5173, 6742, 7990, 10463 PENANG *Curtis* 3041 —DISTRIB Java, *Beccari* 1560

6 DIOSPYROS SCORTECHINII, King & Gamble, n sp A tree 15 to 30 or even 50 feet high, young branches as thick as a crow quill, tawny puberulous, angled, pale when dry *Leaves* alternate, small, membranous, narrowly elliptic-oblong, acuminate, much narrowed at the base to the short petiole both surfaces olivaceous-brown when dry, the upper glabrous, the lower often puberulous, especially on the midrib main nerves 8 to 12 pairs, spreading, curved, ascending, somewhat distinct on the lower surface, faint on the upper as are the transverse reticulations length 2 to 4 in, breadth 6 to 1.25 in, petiole 1 to 1.5 in *Male flowers* 5 in long, in shortly pedunculate axillary fascicles of 2 or 3, or solitary and pedicellate *Calyx* 1 in long, tomentose outside, glabrous inside, 1 in long, campanulate, deeply divided into 4 broad almost truncate lobes *Corolla* coriaceous, 3 in long, glabrous, tube tapering a little to the apex, lobes 4, oblong, sub acute, spreading *Stamens* 8, anthers shortly lanceolate, as long as the filaments *Female flowers* longer than the ♂, solitary, the pedicel as long as the calyx, tomentose *Ovary* ellipsoid, densely pilose, style short, conic, stigmas small, glabrous *Fruit* ellipsoid, crowned by the very short style, puberulous *Calyx* at its base cupular, 2 in across, tomentose outside, 75 in long and 4 in in diam

PIRAK *Curtis* 2092, King's Collector 2407, 4126, 5002, 5296, 6356, *Scortechini* 377, Wray 638

7 DIOSPYROS FLAVICANS, Hiern in Trans Camb Phil Soc XII 205 (1873) A tree 40 to 70 feet high, young branches rather thicker than a crow quill, cinereous puberulous becoming glabrous *Leaves* alternate, thinly coriaceous, elliptic to oblong-elliptic, apex shortly acuminate, the base cuneate, upper surface when dry olivaceous, glabrous, the lower pale brown, densely puberulous on the stout midrib, main-nerves 5 to

7 pairs, curved, ascending, length 3.25 to 5 in, breadth 1.35 to 2.5 in, petioles 1 to 1.5 in. *Male flowers* 4.5 in long, 2 to 6 together, in axillary or extra axillary bracteate sessile tomentose fascicles. *Calyx* sub-sessile, campanulate pubescent outside, glabrous inside, the limb deeply divided into 5 broadly ovate bluntly acuminate spreading lobes. *Corolla* salver shaped, tube slightly inflated and glabrous in the lower half outside, cylindric and pubescent in the upper half, inside glabrous, limb with 4 broadly oblong obtuse glabrescent spreading lobes. *Stamens* 12 of different lengths, attached in 3 rows in the tube, anthers lanceolate cordate unguiculate, filaments slender and of varying length rudimentary ovary none. *Female flowers* conspicuously bi bracteate, in cymes like the ♂ but shortly pedunculate. *Calyx* as in the ♂ but less deeply lobed. *Fruit* ellipsoid, not much narrowed at the ends, slightly tetragonous, glabrous, .75 in long and about .35 in in diam, crowned by the short remains of the style, the calyx clasping its base about half as long, with 4 deep triangular lobes. *Seeds* 4, ridged. Clarke in Hook fil Fl Br Ind III 562, Kurz in Journ Ac Soc Beng XLVI, n 236, For Fl II 135 *Guatteria* ? *flavicans*, Wall Cat 7295 *Ebenaceae* sp 2, Griff Notul IV. 291

MALACCA *Grieth* (K D) 451, 3623, *Mungray* (K D) 972 (as to male plant only), *Hilfer* (K D) 3639? PENANG *Curtis* 1602 SELANGOR *Ridley* 10556 PERAK 2058, *Kings Collector* 2480 3354, 3380, 3771, 6149, 6633, 10007

8 *Diospyros apiculata*, Hiclin in Trans Camb Philos Soc XII 186 (1873). A shrub or small tree, young branches half as thick as a goose quill, fulvous hirsute. *Leaves* alternate, membranous, oblong, or elliptic oblong, sometimes rather oblanceolate, finely caudate acuminate, slightly narrowed to the rounded or somewhat cuneate base, both surfaces dark olivaceous brown when dry, transversely reticulate, upper surface sparsely adpressed pubescent, the midrib and main nerves pubescent and slightly depressed, lower surface darker, and with many long rather coarse hairs, especially on the prominent midrib and 8 to 10 pairs of slightly curved ascending main nerves, length 5.5 to 7 in, breadth 1.5 to 2.5 in, petiole .1 in, tomentose. *Male flowers* about 3 together axillary, subsessile, .35 in long. *Calyx* 4 to 5 partite, about .25 in long, pubescent, lobes narrowly lanceolate. *Corolla* tubular, 4 lobed, 4 in long, the lobes spreading, oval, obtuse. *Stamens* 6 to 12, unequal, glabrous, anthers linear-oblong, acuminate, filaments often geniculate, dilated and somewhat united at the base, rudimentary ovary small, hairy. *Female flowers* 1 to 3 together on short axillary, minutely hispid cymes



*Fruit* sub-sessile, solitary, ovoid-conic, finely rusty-setose, especially in the upper half, about 1 in. long and .5 to .75 in. across, apiculate. *Seeds* about 4, albumen not ruminant. Clarke in Hook. fil. Fl. Br. Ind. III. 553.

MALACCA *Mangay* (K.D.) 1514. PERAK *King's Collector* 5127, 6770 PENANG *Curtis* 1584.

9. *DIOSPYROS LANCEÆFOLIA*, Roxb. Hort. Beng. 93 (1814). A tree; young branches twice as thick as a crow-quill, adpressed-puberulous, dark brown when dry. *Leaves* alternate, coriaceous; oblong, lanceolate or oblong-lanceolate, acute or acuminate, the base rounded or cuneate, the edges recurved, both surfaces olivaceous-brown when dry, the upper darker and shining, the lower paler and dull, main-nerves 7 to 9 pairs, spreading, faint on both surfaces; midrib bold on the lower surface, depressed on the upper; length 2 to 3 in.; breadth .65 to 1 in.; petiole 15 to .2 in. *Male flowers* sessile in clusters. *Calyx* .15 in. long with 4 ovate tawny-sericeous lobes. *Corolla* .35 to .5 in. long, narrowed upwards, the lobes .15 in. long. *Stamens* about 16, anthers linear, glabrous or slightly pilose at the base; filaments minutely pilose. *Female flowers* solitary or in pairs on the branches below the leaves, .5 in. long. *Calyx* .3 in. long, very coriaceous, densely sericeous-pubescent on both surfaces, deeply divided into 4 erect, broadly reniform, acute lobes. *Corolla* a little longer than the calyx, densely sericeous-tomentose outside, the tube glabrous inside, lobes of limb 4, oblong, very thick. *Staminodes* 8, linear compressed. *Ovary* broadly ovate, acuminate, densely silky; stigmas 4, glabrous. *Fruit* ovoid or sub-globose, rusty-villous; its calyx 1 in. in diam. with thickened tube and spreading lobes. Roxb. Fl. Ind. II. 537; A. DC. Prod. VIII. 232; Hiern in Trans. Camb. Phil. Soc. XII. 213, Kurz in Journ. As. Soc. XLVI, ii. 236, and For. Fl. II. 136, Clarke in Hook. fil. Fl. Br. Ind. III. 562. *D. multiflora*, Wall. Cat. 4144, A. DC. l.c. 231. *D. amœna*, Wall. Cat. 4139, A. DC. l.c. 231.

SINGAPORE: *Ridley* 4964. PAHANG *Ridley* 1601.—DISTRIB. Assam range of hills, Burma, Sumatra.

The chief characters separating this from *D. lucida*, Wall., are the longer lobes of the calyx of the female flower and the somewhat larger and more hairy fruit. This species is not common within our area, whereas *D. lucida* is a common tree.

10. *DIOSPYROS PACHYPHYLLA*, Clarke in Hook. fil. Fl. Br. Ind. III. 568 (1882). A tree, young branches rather thinner than a goose-quill, deciduously puberulous, soon glabrous. *Leaves* coriaceous, alternate; elliptic or oblong, sub-acute, the base rounded; both surfaces when

dry rather pale olivaceous brown, glabrous, the upper shining, the lower glaucous, dull, main nerves 8 or 9 pairs, curving upwards, faint on both surfaces midrib bold on the lower surface, depressed on the upper, length 3 to 5 in, breadth 1.5 to 2.5 in, petiole .25 to .4 in. *Male flowers* in short rusty pubescent axillary and extra axillary cymes from 5 to 75 in long, bracts ovate, 1 in long. *Calyx* 15 in long, campanulate, adpressed rusty tomentose on both surfaces, cut half way into 4 broad triangular erect lobes. *Corolla* tomentose externally (fide C. B. Clarke) nearly 5 in long, its lobes about 1 in. *Stamens* about 12, anthers linear, with villous connective and glabrous filaments. *Female flowers* unknown. *Fruit* globular, the apex concave and bearing the short remains of the style, .65 in in diam, minutely rusty adpressed pubescent, becoming glabrous, the calyx at its base woody, cupular, with 4 broad lobes with reflexed apices.

MALACCA *Mangay* (K D) 974 SINGAPORE *Ridley* 5644

This does not agree with *D. undulata*, Wall. of which Hiern in Trans Camb Phil Soc XII 21, makes it a variety. It comes much nearer to but is smaller in all its parts than the plant named by us *D. Wallichii* which was originally issued as *D. macrophylla* Wall. Cat 4141.

11 *Diosyros clavigera*, Clarke in Hook fil Fl Br Ind III 558 (1882). A tree, all parts glabrous except the minutely pilose ciliate margin of the calyx. *Leaves* alternate, coriaceous, elliptic, tapering slightly to each end (sub rhomboidal), both surfaces warm brown when dry, the upper glabrous, shining, the lower dull, main nerves 6 or 7 pairs, little curved ascending slightly prominent on the lower surface, faint on the upper, length 3.25 to 4.5, breadth 1.5 to 2.15 in, petioles .15 to .2 in. *Male flowers* 3 to 16 together in small sessile axillary and extra axillary cymes. *Calyx* 15 in long deeply divided into 4 obtuse lobes. *Corolla* (in bud) .35 in long clavate, glabrous outside, the upper part very thick, 4 lobed. *Stamens* about 16, glabrous anthers oblong shortly apiculate. *Female flower* and fruit unknown. *D. Ebenum*, Hiern (not of Koenig) in Trans Camb Phil Soc XII 208 (in part).

MALACCA *Mangay* (K D) 971 GRIFFITH (K D) 3635 LANGKAT *Curtis* 3418 SINGAPORE *Mangay* 5066

12 *Diosyros bilocularis*, Oliver in Hook Ic Pl t 2336 (1894). A glabrous tree 60 to 80 feet high, young branches about the thickness of a goose quill, dark purplish when dry and shining, slightly striate. *Leaves* thickly coriaceous, elliptic, sub acute, the base slightly cuneate, the edges (when dry) recurved both surfaces olivaceous when dry, the upper shining, the lower paler and dull, midrib inconspicuous and

slightly channelled on the upper surface, bold on the lower; main-nerves 10 to 12 pairs, slightly curved, spreading, interarching far from the edge, faint on both surfaces, length 5 to 6.5 in., breadth 2.5 to 3.25 in. *Male flowers* .65 in. long (in bud) on rusty-pubescent pedicels .3 to .4 in. long, in axillary and extra-axillary fascicles of 2 to 4, with a few tomentose bracteoles at their bases. *Calyx* very coriaceous, .25 in. long and nearly as much in width at the mouth; limb 4-lobed, the lobes very short and broad. *Corolla* narrowly tubular, .4 in. long, very thick; lobes of limb long, narrowly oblong. *Stamens* 16; sub-sessile, linear, sub-equal, apiculate; rudimentary ovary none. *Female flower*; calyx and corolla as in the ♂, staminodes none; ovary oblong or oval-ovoid, narrowed at the apex, longer than the calyx, 2-celled; ovules 2 in each cell and pendulous. *Fruit* olive-shaped, shortly apiculate, 1.5 to 2 in. long and 1 to 1.25 in. in diam. at the middle, yellow when ripe, its pedicel obconic, stout, woody, .4 in. long, calyx in ripe fruit flat, with 4 broad blunt lobes. *Seed* solitary; pericarp thin, only .3 in. across, albumen large stellately ruminant. *Maba Mangayi*, Hiern in Trans Camb Phil Soc XII 107, Clarke in Hook fil Fl. Br. Ind III 552.

MALACCA *Mangay* (K D) 976, Derry 1092. SINGAPORE *Ridley* 27, 2755, 4920. PERAK. at elevations of 1,500 to 2,000 feet, *King's Collector* 7383.

13. *DIOSPYROS STYRACIFORMIS*, King & Gamble, n. sp. A tree (?), young branches rusty-pubescent, slightly thicker than a crow-quill. *Leaves* thinly coriaceous; elliptic to elliptic-lanceolate, the apex sub-acute or acute, the base cuneate, upper surface dark olivaceous, shining, glabrous except the depressed midrib; the lower surface dull, paler, with deciduous rufous pubescence, especially on the prominent midrib; main-nerves about 5 pairs, ascending, little curved, slightly prominent on the lower surface only, length 2.5 to 4 in., breadth 1 to 2 in.; petiole .2 to .35 in. *Male flowers* a few together in short cymes grouped in small axillary clusters. *Calyx* .2 in. long, narrowly campanulate, densely rusty-tomentose externally like the corolla, the mouth with deep narrowly-triangular teeth. *Corolla* 5 in. long, narrowly tubular, cut half-way down into 4 oblong blunt lobes. *Stamens* 16, in pairs, unequal, linear, apiculate; filaments unequal in length; rudimentary ovary none. *Female flowers* solitary, calyx much longer than in the ♂, its 4 lobes thick, broad, reniform, rusty-pubescent. *Corolla* not known, ovary hairy. *Fruit* globose with the apex truncate and depressed in the middle, densely but minutely pale rusty-tomentose, 5 in. long and about .65 in. in diam. *Calyx* at its base deeply cupular with 4 spreading triangular teeth. *D. nov. spec.*, C. B. Clarke in Herb.

Kew. *D. hirsuta*, Linn fil, ? var, Hiern in Trans Camb Phil Soc XII 165

MALACCA *Maingay* (K D) 969 SINGAPORE *Ridley* 3787

Ridley's No 1084, from Bukit Timah, in Singapore seems to belong to this. The only specimen I have seen is imperfect

14 *DIOSPYROS LUCIDA*, Wall Cat 4127 (1829) A tree 40 to 50 feet high, young branches from half as thick to as thick as a crow quill minutely puberulous, becoming glabrescent, dark coloured. *Leaves* alternate, coriaceous, oblong or elliptic oblong, sub-acute or obtuse, the base rounded or cuneate, sometimes a little oblique, both surfaces when dry pale olivaceous brown, glabrous, main nerves 5 to 9 pairs, spreading curved, faint on the lower surface, slightly depressed on the upper midrib bold on the lower surface, somewhat depressed on the upper length 1.25 to 4.5 in, breadth .5 to 1.5 in, petioles 2 to 4 in. *Male flowers* sessile, in small fascicles. *Calyx* nearly 15 in long, campanulate with 4 erect broadly triangular lobes, tomentose on both surfaces. *Corolla* narrowly tubular, more than twice as long as the calyx, tetragynous in bud, sericeous tomentose outside, the tube glabrous inside, limb deeply divided into 4 narrowly oblong thick lobes. *Stamens* 12 to 16, in pairs united by their short filaments and face to face, anthers linear, glabrous, minutely apiculate, and on short sericeous filaments, rudimentary ovary linear. *Female flowers* 1 or 2 together, axillary or extra axillary, sub-sessile. *Calyx* longer than in the ♂, lobed nearly to the base, lobes broadly ovate, their recurved margins minutely tomentose. *Fruit* globose, .75 in or more in diam, sub-truncate and slightly umbonate at the apex, adpressed rusty pubescent at first, ultimately glabrous, 4-6 seeded, the accrescent calyx at its base woody, cupular, 6 in across with 4 short broad reflexed lobes, albumen of seed not uminate. A DC Prod VIII 233, Clarke in Hook fil Fl Br Ind III 568. *D. hirsuta*, var *lucida* Hiern in Trans Camb Phil Soc XII 163(not of Linn fil)

MALACCA *Griffith* (K D) 3637, *Maingay* (K D) 970, 973, 977, 3,500, *Derry* 1439 PERAK *Scottichini*, *Wray* 3018, 3056 PENANG *Curtis* 250, 1602, *King's Collector* 1050, 1760 SINGAPORE *Ridley* 2119, 2749, 3580, 4962, 4963, 6129, 8115, 9212, 9517

This is probably only a southern form of the Indian species *D. lanceifolia* Roxb

15 *DIOSPYROS OBLONGA*, Wall Cat 4124 (1829) A tree, young branches thinner than a goose quill, purplish brown when dry, glabrous. *Leaves* alternate, coriaceous, glabrous, oblong elliptic, shortly and abruptly apiculate, the base rounded or slightly cuneate, both surfaces

faintly reticulate, quite glabrous, shining, main-nerves 16 to 18 pairs, spreading, little curved, interarching boldly at a little distance from the edges, prominent on the lower surface, depressed on the upper, midrib very bold on the lower surface, depressed on the upper, length 7 to 9 in, breadth 3 to 3.75 in, petiole 4 in, very stout. *Male flowers* about 5 in long, salver shaped, in short axillary cymes, coriaceous, subsessile, 5 in long. *Calyx* and *corolla* everywhere adpressed tomentose. *Calyx* shorter than the corolla, campanulate, cleft to near the base into 5 oblong, blunt, sub-erect lobes. *Corolla* tube narrow, not constricted at the throat, limb with 5 large broad rotund lobes with recurved edges. *Stamens* 10, united in pairs by the bases of their filaments, the inner ones smaller, all inserted on the base of the calyx tube. *Female flowers* 1 to 5 together, 2.5 to 3 in long, with 5 deep ovate-oblong auriculate sub-plicate lobes. *Corolla* 3.5 in long, densely hairy outside, deeply lobed, staminodes 5, *ovary* 10 celled, rusty hairy. *Fruit* sub-globose, sub-truncate at base and apex, glabrous when ripe, the hispid accrescent *calyx* 7.5 in across, its lobes auriculate, albumen of seed not ruminant. A DC Prodr VIII 243. Hiern in Trans Camb Phil Soc XII 243, Clarke in Hook fil Fl Br Ind III 569, Miq Fl Ind. Bat II 1045.

MALACCA *Mangay* (K D) 967. PENANG *Curtis* 1564, 2487, 3658. SINGAPORE *Ridley* 2747, 3031, 6311. PERAK *King's Collector* 3794, 4924, 7237, 8278.

16 DIOSPYROS HPLFRI, Clarke in Hook fil Fl Br Ind III 569 (1882). A tree 20 to 30 feet high, young branches half as thick as a goose quill, pale puberulous, the bark dark. *Leaves* alternate, coriaceous, elliptic or elliptic-oblong sub-acute or obtuse, the base broad or sub-acute, the upper surface dark olivaceous brown when dry, glabrous except the depressed puberulous midrib, the reticulations minute but distinct, lower brown, glabrescent but puberulous on the rather stout midrib and nerves, main nerves 10 to 12 pairs, rather faint spreading, horizontal, interarching boldly about 2.5 in from the edge, length 5.5 to 7.5 in, breadth 2.5 to 3.25 in. petiole 4 to 5 in, stout, pubescent. *Male flowers* unknown. *Female flowers* 5 in long, axillary, solitary or 2 together, sessile. *Calyx* coriaceous, densely pubescent inside and out, deeply divided into 5 broadly oblong, sub-acute lobes, accrescent, and becoming concave along the midribs of the lobes. *Corolla* somewhat longer than the calyx, sericeous externally, the tube short, the limb lobes deep, broadly oblong, blunt, staminodes few, flat. *Ovary* broadly ovoid, densely sericeous tomentose. *Fruit* ovoid ellipsoid, nearly 1 in long, and slightly less in diam, glabrous, the accrescent *calyx* embracing its base deeply 5 lobed, plicate.

MALACCA *Griffith* (K D) 3632 KIDAH *Curtis* 2596, 8327?,  
*Rudley* 327

17 *Diospyros tristis*, King & Gamble n sp. A tree 40 to 50 feet high, young branches half as thick as a goose quill, covered with deciduous almost black tomentum. *Leaves* alternate, coriaceous, oblong elliptic, shortly acuminate, the base rounded or cuneate, both surfaces dingy olivaceous brown when dry, minutely reticulate, upper surface glabrous, shining, the lower dull, the prominent midrib densely clothed with dark hairs. The 7 or 8 pairs of prominent ascending main nerves and the intermediate spaces with a few similar hairs with bulbous bases, length 6 to 9 in., breadth 2 to 2.75 in., petioles 4 to 5 in. *Male flowers* 3 in long, in short axillary cymes 7.5 in long, the branches and pedicels densely dark rusty tomentose outside. *Calyx* glabrous inside, the mouth with 5 broad short obtuse teeth. *Corolla* fleshy, glabrous, like the calyx in shape and of about the same length. *Stamens* 24, anthers lanceolate, shortly appendiculate at the apex, sessile. *Female flowers* unknown. *Fruit* depressed globose glabrous, shining, nearly 2 in in diam., the calyx at its base thick, woody, flat, 1.5 in across, with 5 spreading triangular lobes.

PERAK *Wray* 2190, *King's Collector* 5521

18 *Diospyros pauciflora*, King & Gamble n sp. A glabrous shrub or small tree, young branches rather thinner than a goose quill, then bark dark and rough. *Leaves* rather large alternate very coriaceous, oblong lanceolate or oblanceolate, shortly caudate acuminate, the base slightly cuneate, upper surface olivaceous, shining, lower ochraceous, dull, main nerves 8 to 10 pairs, spreading, curved, and interarching boldly 1 or 2 in from the slightly recurved edge, length 5 to 10 in., breadth 1.75 to 3 in., petiole .25 to .3 in., corrugated. *Male flowers* 3 in long, sessile and in sessile axillary fascicles of from 3 to 6. *Calyx* .25 in long, narrowly tubular, somewhat narrowed at base and apex, coriaceous, pale in colour, the mouth with 4 broad triangular short erect lobes, outer surface with a layer of minute adpressed tawny tomentum and scattered over it many black adpressed hairs. The interior pale, pustular, with a few similar scattered hairs and a thick ring of them near the base surrounding the rudimentary ovary and clothing it also. *Corolla* slightly longer than the calyx, fleshy, widely tubular, divided for half its length into 4 broad obtuse lobes with a broad line of adpressed black hairs along the midrib of each outside, the rest of the outer surface adpressed sericeous, the interior quite glabrous. *Stamens* 12, viz., 8 in pairs standing face to face and united by their short filaments, and 4 free, anthers of all linear, densely hairy, on short glabrous filaments. *Female flowers* not seen.

PERAK *King's Collector* 7363, 7749

19 *DIOSPYROS ELLIPSOIDEA*, King & Gamble, n sp A tree or shrub, young branches somewhat thinner than a goose-quill, deciduously and densely rusty-puberulous *Leaves* alternate, thinly coriaceous, oblong to elliptic-oblong, rarely slightly oblanceolate, apex acute, base rounded, both surfaces when dry olivaceous-brown, the upper glabrous, the midrib sometimes rusty puberulous, the lower surface darker, minutely puberulous, midrib and 10 to 12 pairs of curved ascending nerves faintly prominent on the lower and depressed on the upper surface, length 6 to 10 in, breadth 2.5 to 3.5 in, petioles 2.5 to 3 in *Male flowers* in dense axillary cymes of 6 to 12, not much longer than the petioles, bracteoles few, broad, densely rusty-tomentose *Calyx* sub-sessile, tomentose externally, glabrous internally, divided into 4 sub-rotund blunt lobes *Corolla* glabrous, very fleshy towards the apex, with 4 broad deep lobes *Stamens* at the base of the tube, broadly ovate, apiculate, filaments flattened *Female flowers* in subsessile clusters of 3 or 4 *Calyx* with 4 rounded lobes, reflexed, coriaceous, and in fruit only 3.5 in across *Fruit* ellipsoid, glabrous, crowned by the short style and subtended by the reflexed broadly lobed small calyx, 1 to 1.25 in long and 8 in in diam *Seeds* few, ellipsoid, apiculate, two of the sides compressed

PERAK *King's Collector* 2233, 3250, 7098, 7269, 7320, 7689, 8215, *Scootchin* 1615

20 *DIOSPYROS WALLICHII*, King & Gamble A tree 30 to 60 feet high young branches covered with minute coarse hair, the older verrucose *Leaves* alternate coriaceous, oblong or elliptic-oblong, apex acute, base cuncate or rounded edges slightly recurved, upper surface glabrous and shining, lower paler, minutely pubescent at first but becoming glabrescent, both olivaceous when dry, midrib depressed on the upper surface, bold on the lower, main nerves 14 to 18 pairs slightly curved, spreading, prominent on the lower surface, faint on the upper, length 8 to 14 in, breadth 2.5 to 5 in petiole 5 to 7.5 in *Male cymes* 5 to 7.5 in long, in clusters (often crowded) on the branches, 7-10 flowered, bracteoles broad, blunt, concave, thick like the calyx and corolla, and like them densely rusty tomentose externally *Calyx* 1 to 1.5 in long, tubular, the mouth with 4 blunt triangular erect teeth, tomentose on both surfaces *Corolla* thrice as long as the calyx, narrowly tubular, glabrous inside *Stamens* 16 in 2 rows, the inner attached to the outer at the bases of their filaments, all linear, rudimentary ovary small, hairy *Female flower* rather larger than the ♂, but in smaller cymes, the calyx tetragonous and deeply grooved, very fleshy, becoming woody, very large and boldly 4 angled and

grooved in the ripe fruit *Corolla* as in the ♂, but somewhat longer *Staminodes* about 16 *Ovary* conical densely hairy, stigma glabrous, with 4 deep oblong truncate lobes *Fruit* 1 in in diam, nearly twice as much across the calyx, sub globose, deeply immersed in the large thickened calyx, its apex truncate concave, seeds 4 or 5 *D macrophylla*, Wall Cat 4141 (not of Blume) *D undulata*, Wall A DC Prodr VIII 233, Hiern in Trans Camb Phil Soc XII 216 (in part) Kurz in Journ As Soc Beng XLVI 11 23, and For Fl II 135 (in part), Clarke in Hook fil Fl Br Ind III 568

PENANG *Curtis* 1085, *Ridley* 7174 MALACCA *Maugay* (K D), 974, *Griffith* (K D) 3636 PERAK *Scortechini* 1976, *Wray* 2535, 2865 *King's Collector* 2966, 2982, 4058, 6779, 7459, 7619, 10123 KEDAH *Curtis* 2594 SELANGOR *Ridley* 2748, 8544

This is the plant issued by Wallich as No 4141 of his Catalogue under the name *D macrophylla*. Being different from the older *D macrophylla* of Blume, a new name had to be found for it. This was done by De Candolle, who reduced it, as a variety to Wallich's *D undulata* with the type specimen of which in Wallich's own herbarium it does not agree. De Candolle was followed by Hiern, Kurz and Clarke, we now restore it to specific rank. The true *D undulata*, Wall, is a Burmese species. It is found also in the Andaman Islands, but it has not as yet been collected in Malaya.

21 DIOSYROS ARGENTEA, Griff Notul IV 288 (1854) A tree 15 to 50 feet high young branches about as thick as a goose-quill, covered with sub deciduous yellowish silky hairs. *Leaves* large, coriaceous, oblong, apex acute, base rather abruptly cuneate or rounded, upper surface warm brown when dry, glabrous and shining, the midrib depressed, lower densely covered with yellowish adpressed sericeous hair, the midrib very stout, main nerves invisible on both surfaces, length 6 to 10 in, breadth 1.65 to 3.5 in, petioles 1 to 2.5 in. *Male flowers* in somewhat supra axillary few flowered shortly pedunculate spike like cymes 1 to 1.25 in long (peduncle included), bracts ovate 2 in long. *Calyx* 2.5 in long, deeply 4 lobed, villous. *Corolla* 3.5 in long, tubular, lobed half way down, very villous outside. *Stamens* 20 to 24. *Female flower* solitary on a peduncle 2 in long, calyx campanulate, 5 in long, with ovate lobes. *Corolla* 6.5 in long. *Staminodes* 4 to 5. *Ovary* 4 celled, 8 ovuled, densely hairy, styles 4, erect, hairy. *Fruit* ellipsoid, apiculate, 2 to 2.5 in long and 1 to 2 in in diam, densely rusty tomentose the calyx persistent, its lobes enlarged, broad, very coriaceous, shortly hairy. Hiern in Trans Camb Phil Soc XII 262, Clarke in Hook fil Fl Br Ind. III 569 *D discolor*, Wall Cat 4131 (not of Willd.)

MALACCA *Griffith* (K.D) 3625, *Maugay* (K D) 968, 970, *Goodenough*



1301, 1476. SINGAPORE: *Ridley* 3648, 5898; *Hullett* 825. PERAK: *Wray* 172, 1392; *King's Collector* 4812, 5862, 6387, 6896, 8003, 8142; *Scortechini* 498. PANGKORE: *Curtis* 1365. SELANGOR: *Ridley*. 10271. PAHANG: *Ridley* in Trans. Linn. Soc. Ser. 2, III. 318 in Tahan woods.

22. *DIOSPYROS RIGIDA*, Hiern in Trans. Camb. Phil. Soc. XII. 257 (1873). A tree 30 to 60 feet high; young branches as thick as a goose-quill, minutely dark rusty-tomentose. *Leaves* alternate, very coriaceous, large; oblong or elliptic-oblong, equal-sided, the apex sub-acute, the base rounded and neither oblique nor cordate; upper surface dark olivaceous-brown when dry, shining, minutely reticulate; lower paler olivaceous-brown, covered except the midrib with a very thin film of minute tomentum, minutely reticulate; midrib very bold on the lower surface, pubescent at the sides, slightly depressed on the upper; main-nerves 14 to 20 pairs, spreading, interarching .35 in. from the edge, slightly distinct on the lower surface, invisible on the upper, length 10 to 18 in., breadth 2 to 4 in.; petiole 4 to 6 in., very stout. *Male flowers* when in bud .4 in. long and nearly .3 in. in diam, few, in short extra-axillary cymes, densely covered with black tomentum, the pedicels stout, deflexed, about .75 in. long. *Calyx* densely tomentose, ovoid, tapered to the apex, its mouth with 4 broad shallow blunt teeth. *Corolla* (apparently) not much longer than the calyx, very coriaceous, glabrous, the tube ovoid, the lobes short, oblong, blunt. *Stamens* about 20, inserted at the base of the tube, unequal, anthers lanceolate, apiculate, almost sessile. *Female flowers* unknown. Ripe fruit in cymes, depressed-globose, glaberrulous, with a woody rind, 1.75 in. in length from base to apex and 2 in. in diam., remains of style none; *calyx* at base of fruit cupular, 1.5 in. across, divided into 4 reticulate leathery spreading broadly ovate lobes; peduncle .75 to 1.25 in. long, with dark hispid hairs.

PERAK: *King's Collector* 4024, 5732, 5971, 6801; *Wray* 3708.—  
DISTRIB. Borneo.

23 *DIOSPYROS HORSFIELDII*, Hiern in Trans. Camb. Phil. Soc. XII. 193 (1873). A tree 20 to 40 feet high, all parts except the cymes glabrous, young branches thinner than a goose-quill, pale. *Leaves* alternate, coriaceous, oblong-elliptic or ovate-oblong, apex sub-acute, base slightly cuneate or rounded, the edges slightly recurved when dry; upper surface when dry olivaceous-green, lower surface brown; the midrib and nerves depressed; the reticulations, midrib, and 8 to 14 pairs of curved spreading main-nerves very bold and prominent; length 6 to 10 in., breadth 2.5 to 4 in., petioles .35 in. *Cymes* 2 to 3 in. long,

covered with black pubescence, few-flowered, collected on extra-axillary or axillary tubercles, sometimes forming small panicles, consisting mostly of ♂ flowers, and often with only a few ♀, with many oblanceolate blunt bracts 25 to 3 in. long, and some smaller bracteoles, branches of the cyme striate when dry. *Calyx* 15 in long, divided to its base into 4 broadly ovate undulate lobes. *Corolla* in bud cylindric, tetragonous at the base, about 4 in long, tomentose, deeply divided into 4 narrowly elliptic blunt lobes. *Stamens* about 16 in 2 rows, united into a tube, the anterior row smaller than the posterior, all narrow and apiculate, the filaments short and hairy. *Female flowers* like the ♂ as to calyx, but with corolla somewhat longer and with about 12 flat staminodes. *Ovary* ovoid-conic, tomentose, attenuated into a long style. *Stigma* with several small lobes, ovary 8-celled. *Fruit* when ripe ovoid-globular, 1 to 1.25 in in diam, glabrescent, subtended by the accrescent calyx with large reticulate undulate lobes. *Seeds* compressed, oblong. Clarke in Hook fil Fl Br Ind III 571. *D. frutescens*, Hassk Pl As Rar 467 (not of Blume).

MALACCA Griffith (K D) 3620 PERAK *Scortechini* 1765, King's Collector 8261 —DISTRIB. Java

Specimens of this sent from Herbarium Koordersianum, Buitenzorg have pentamerous flowers, but in other respect they do not differ from the Perak specimens in Herb Calcutta.

24 DIOSPYROS TOPOSIOIDES, King & Gamble, n sp. A glabrous tree 15 to 40 feet high, sometimes only a shrub, young branches rather thinner than a goose-quill, pale brown and striate when dry. *Leaves* alternate, coriaceous, oblong-elliptic, shortly acuminate or acute, base rounded, edges slightly recurved when dry, both surfaces pale olivaceous when dry, minutely but distinctly reticulate, the upper shining, the lower darker and dull, midrib channelled on the upper surface, strong and prominent on the lower, main-nerves 16 to 20 pairs, spreading, little-curved, interarching far from the edge, the intermediate nerves nearly as prominent, length 7 to 11 in, breadth 2 to 4 in, petiole 3 to 4 in long, stout, wrinkled when dry like the midrib. *Male flowers* 25 in long, on pedicels longer than themselves, in cymes, axillary panicles about 1 in in length. *Calyx* coriaceous, glabrous, campanulate, with wide truncate entire or sub entire mouth. *Corolla* slightly exceeding the calyx, ovoid, inflated below, contracted to the 4-toothed apex. *Stamens* numerous, linear, slightly auricled at the base, filaments very short. *Female flowers* when in bud 3 in long, conical. *Calyx* acutely 4-angled in bud, the 4 lobes deltoid, very coriaceous, puberulous outside, rusty-tomentose inside, like the ovary and young

fruit, accrescent in fruit. *Corolla* slightly longer than the calyx, tubular, with 4 short erect ovate lobes, quite glabrous. *Staminodes* about 12, flattened, villous behind. *Ovary* conical, densely rusty-tomentose. *Stigma* glabrous, short, with 8 small lobes. *Fruit* in cymes, depressed-globular, 1 to 1.25 in. in diam., much exceeding the minutely reticulate calyx, glabrescent, minutely tuberculate. *Seeds* compressed.

PERAK: *King's Collector* 4106, 4361, 4889, 5769, 8242, 8357; *Scortechini*; *Radley* 3079, 10302?

The leaves of this in texture and reticulations much resemble those of *D. Toposua*, Ham. The flowers and inflorescence are, however, different from those of that species.

25. *DIOSPYROS OLEIFOLIA*, Wall. Cat. 4128 (1829). A tree; young branches twice as thick as a crow-quill, almost black when dry, sparsely pubescent. *Leaves* coriaceous, alternate; narrowly oblong to elliptic, sub-acute or acute, the base cuneate; upper surface pale olivaceous, glabrous, shining, the lower yellowish, dull, for the most part glabrous, but usually with sparse adpressed black detachable hairs near the midrib and base; main-nerves invisible on either surface; midrib strong on the lower surface, slightly depressed on the upper, length 6.5 in., breadth 2 in.; petiole .25 in. long. *Male cymes* on axillary peduncles about .3 in. long, each bearing 3 unequally pedicellate flowers .5 in. long; all very dark in colour and with black hairs like those on the outer surface of the calyx. *Calyx* 4 in. long, tubular-campanulate, densely adpressed rusty-tomentose inside, cut half-way down into 4 triangular erect lobes. *Corolla* tubular, slightly longer than the calyx, very thick, densely tomentose like the interior of the calyx, its lobes 4, very thick, oblong, spreading slightly. *Anthers* attached near the base of the tube, 16, linear-lanceolate, sessile. *Female flowers* on longer panicles than the males; pedunculate calyx with 4 triangular acute lobes, velvety outside, tawny-tomentose inside. *Fruit* depressed-globose, 1.35 in. in diam., the pericarp woody, glabrous when ripe, tawny-tomentose when young, the persistent calyx at its base thick, woody, nearly 1 in. in diam., with dark tomentum outside. A. DC. Prod. VII. 132, Kurz in Journ. As. Soc. Beng. XLI, Pt. II 72, id. XLVI, Pt. II. 235, and For. Fl. II. 132; Hiern in Trans. Camb. Phil. Soc. XII. 204, Clarke in Hook. fil. Fl. Br. Ind. III. 567.

PENANG: *Curtis* 1573 PERAK: *King's Collector* 3876; *Scortechini*.  
—DISTRIB. Burma, Java.

26. *DIOSPYROS BRACHIATA*, King & Gamble, n. sp. A glabrous tree

20 to 40 feet high, young branches half as thick as a goose-quill. *Leaves* alternate, coriaceous, elliptic oblong, acute or shortly acuminate, the base slightly cuneate or rounded, upper surface pale olivaceous when dry, lower pale brown, main-nerves 10 to 12 pairs, curved, ascending, prominent like the midrib on the lower surface, depressed somewhat on the upper, length 5.5 to 9 in breadth 1.5 to 2.5 in, petioles 3 to 5 in. *Male flowers* about 5 in long. *Calyx* 2 in long, campanulate, divided almost to the base into 5 ovate acute erect lobes, each folded vertically along the midrib so as to form a deep dorsal groove, everywhere minutely rusty tomentose. *Corolla* twice as long as the calyx, narrowly tubular, the tube 5 angled, externally divided, the 5 lobes twice as long as the tube, linear-oblong, contorted in aestivation, the external half of each lobe tawny tomentose, the inner half and the whole of the anterior surface glabrous. *Stamens* 14, linear, apiculate, sub-sessile. *Female flowers* 4 in long, collected in compound umbellate axillary cymes 1.5 to 1.75 in long and about as much across, the branches compressed, rusty puberulous, spreading, bearing a few oblong obtuse bracts, flower pedicels varying in length from .1 to 2 in, bracteolate. *Calyx* fleshy, tomentose outside, deeply divided into ovate acuminate erect grooved lobes. *Corolla* tubular, tomentose outside, glabrous inside, very thick, deeply divided into 4 oblong lobes. *Stamens* about 8, lanceolate, flattened. *Ovary* ovoid, tapering into a short style, tomentose. *Fruit* depressed-globose, puberulous, .75 to 9 in diam, and about the same from below the calyx to the somewhat concave apex, calyx woody, thick, 1 in. wide, with triangular deeply grooved sub-acute lobes.

PINANG. *Curtis* 1453, 1454, 10230.

27 DIOSPYROS PANICULATA, Dalz. in Hook. Kew Journ. IV 109 (1852). A tree 50 to 70 feet high, young branches less than half as thick as a goose quill, rusty-puberulous. *Leaves* thinly coriaceous, alternate, elliptic or elliptic-oblong, shortly and bluntly apiculate or acuminate, the base cuneate or rounded, both surfaces pale olivaceous when dry, the reticulations minute and distinct, especially on the glabrous upper surface, main-nerves 5 to 8 pairs, curving upwards and forming arches far from the edge, bold like the midrib on the lower surface and slightly depressed on the upper, lower surface softly pubescent, length 4 to 7.5 in, breadth 1.65 to 2.5 in, petiole .25, stout, channelled, pubescent. *Male and female flowers* not seen. *Fruit* in lax racemoid cymes, ellipsoid, crowned by the small remains of the style, rufous hirsute when young, ultimately glabrous, 1.5 in long and 1 in diam, the accrescent calyx at its base with 4 large broadly ovate membranous lobes with many vertical nerves and numerous distinct

minute reticulations, each lobe 1·25 long and nearly as wide. Dalz. & Gibs. Flora Bombay, 141; Bedd. Ic. Pl. Ind. Or. t. cxxv, and Fl. Sylv. Madr. cxliv; Hiern in Trans. Camb. Phil. Soc. XII. 190; Clarke in Hook. fil. Fl. Br. Ind. III. 570.

PERAK: *King's Collector* 7637, 8163.

The scanty specimens from Perak are in fruit only, but the leaves and fruit agree so well with those of *D. paniculata*—a species hitherto known only from the west of the Indian Peninsula—that, in spite of the anomalous geographical distribution, we, temporarily at least, refer the Perak specimens to that species.

28. *DIOSPYROS KUNSTLERI*, King & Gamble, n. sp. A tree 20 to 40 feet high; young branches as thick as a goose-quill, glabrous. *Leaves* alternate, large, thickly membranous; elliptic to elliptic-oblong, acute, the base rounded; both surfaces, when dry, olivaceous-brown, the lower rather darker than the upper, somewhat shining, faintly reticulate; main-nerves 8 to 12 pairs, much curved, spreading, ascending, and forming wide arches ·25 in. from the edge, prominent on the lower surface like the midrib, somewhat depressed on the upper; length 8 to 12 in., breadth 3·5 to 4·5 in.; petioles ·25 to ·35 in. *Male flowers* unknown. *Female flowers* in short axillary and extra-axillary puberulous cymes, nearly 1 in. long, pedicellate; bracts narrow, nearly as long as the pedicels, oblong. *Fruit* in short stout cymes (unripe) depressed-globular, crowned by the short remains of the style, with 4 or 5 vertical ridges, everywhere densely rusty-tomentose, subtended by the accrescent almost woody calyx, with 4 deep reniform-cordate apiculate erect undulate lobes.

PERAK. *King's Collector* 4343, 7633, 8229.

29. *DIOSPYROS NUTANS*, King & Gamble, n. sp. A shrub or small tree 8 to 16 feet high; young branches less than one-third as thick as a goose-quill, deciduously villous, the older much thicker with deeply channelled dark-coloured, sub-glabrous bark. *Leaves* alternate, thinly coriaceous; oblong or sub-oblongate-oblong, apex shortly caudate-acuminate, the base rounded; both surfaces brown when dry, the upper glabrous, the lower puberulous, but often villous on the prominent midrib; main-nerves 7 to 10 pairs, curved, ascending, interarching near the margin, the reticulations distinct; length 5 to 7 in., breadth 1·5 to 2·25 in.; petiole ·15 in. *Cymes* umbellate, few-flowered, borne on the apices of slender slightly supra-axillary flexuous puberulous peduncles much longer than the leaves (often twice as long); bracteoles few, small, lanceolate, concave. *Male flowers* in different cymes from the females, ·5 in. long, on short pedicels less than ·1 in. long. *Calyx* puberulous, campanulate, with 5 long lanceolate lobes. *Corolla* four times as long

as the calyx, narrowly tubular, slightly constricted at the throat, hairy outside, glabrous inside, the limb with 5 deep oblong lobes. *Stamens* 10, linear-elliptic, apiculate, inserted in the bottom of the tube, 5 sessile and 5 with filaments. *Female flowers* shorter than the ♂, with small filamentous staminodes. *Ovary* narrowly ovoid, densely rufous-hirsute, attenuated into a long pubescent style crowned by 5 short glabrous reflexed small stigmas. *Fruit* narrowly ellipsoid, sparsely hairy, .6 to 1 in. long and .5 in. in diam., crowned by the persistent style and subtended by the non-acrescent calyx. *Seeds* few, narrowly ellipsoid.

PERAK: *Scortechini* 674, 1678; *King's Collector* 378, 2675, 2987, 3573, 7087.

Differs from all the other Malayan species by its long peduncled pendulous inflorescence.

#### SPECIES IMPERFECTLY KNOWN.

30. *DIOSPYROS REFLEXA*, King & Gamble, n. sp. A tree 50 to 70 feet high, young branches as thick as a goose-quill, covered with a layer of minute deciduous rusty pubescence. *Leaves* alternate, thickly coriaceous; oblong to elliptic, shortly acuminate, the base cuneate; upper surface olivaceous-brown when dry, the lower pale brown, both minutely reticulate, main-nerves 8 to 10 pairs, spreading, interarching .15 in. from the slightly recurved edges; length 5 to 7.5 in., breadth 1.75 to 3 in.; petiole .4 or .5 in. *Flowers* unknown. *Fruit* hemispheric with depressed truncate apex, under 1 in. in diam.; the calyx embracing the very base of the fruit with 4 fleshy much reflexed revolute triangular fleshy lobes, densely rusty-tomentose like the fruit.

PERAK: *King's Collector* 7676, 7747.

The curious fleshy calyx with much-reflexed lobes distinguishes this from all the other Malayan species.

31. *DIOSPYROS PENANGIANA*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, covered with deciduous hair of two sorts, namely, a uniform coat of minute rusty tomentum with long rusty bristle-like hairs protruding through it. *Leaves* alternate, coriaceous, oblong, shortly and bluntly acuminate, narrowed below the middle to the rather broad auriculately cordate base; upper surface when dry pale brown, shining, glabrous except the puberulous depressed midrib, lower surface reddish-brown, transversely reticulate, with pubescence like that of the young branches on the stout midrib and 10 to 14 pairs of ascending rather straight main-nerves, otherwise glabrescent; length 5.5 to 7.5 in., breadth 1.25 to 2.25 in.; petioles .15 to .2 in. long, hispid. *Male and female flowers* unknown.

*Fruit* sessile, globular, from .75 to 1 in. in diam., densely covered with minute rufous tomentum, crowned by the short remains of the style and subtended by the small calyx with 5 broad reflexed lobes.

PENANG: *Curtis* 2221.

Collected only in Penang. In leaves this resembles the Bornean plant named by Hiern *Maba? cordata*. The 5-cleft calyx of this is suggestive rather of *Diospyros* than of *Maba*.

32. *DIOSPYROS RUFA*, King & Gamble, n. sp. A tree 60 to 80 feet high; young branches about half as thick as a goose-quill or thicker, glabrous, brown and rough when dry. *Leaves* alternate, thickly coriaceous; oblong-elliptic, sometimes oblanceolate, the apex shortly and bluntly acuminate, the base much narrowed; upper surface warm brown when dry, glabrous, very shining; the lower dull, glabrous or slightly puberulous towards the base; main-nerves 7 to 10 pairs, spreading, little curved, interarching near the slightly incurved edges, slightly prominent on the lower surface and somewhat depressed on the upper when dry; length 5.5 to 7.5 in., breadth 1.75 to 2.25 in.; petioles .4 to .6 in., stout, channelled. *Male and female flowers* unknown. *Fruit* globular-ovoid, blunt, 1.25 to 1.5 in. long and about 1.15 in. in diam., densely rusty-tomentose. *Calyx* at base flat, 4-angled, .4 in. in diam., rusty-tomentose.

PERAK: *King's Collector* 3330, 4945, 5409, 6712

33. *DIOSPYROS AREOLATA*, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches thinner than a goose-quill, rusty-puberulous becoming glabrous. *Leaves* alternate, very coriaceous; oblong, sub-acute, the base rounded; both surfaces glabrous except the puberulous midrib and sometimes the main-nerves, hepatic-brown when dry; the upper shining, minutely and faintly areolate; the lower dull and boldly areolar-reticulate, midrib bold on the lower surface, slightly depressed on the upper; main-nerves about 7 pairs, curved, ascending abruptly, faint on the lower surface, almost invisible on the upper, length 4.5 to 6 in., breadth 1.5 to 1.75 in., petioles .5 or .6 in. *Male flowers* (only buds seen) under .5 in. in length, collected near the ends of the branches in tomentose cymes .5 to 1 in. long. *Calyx* coriaceous, on a thick pedicel shorter than itself, ovoid in bud; the mouth with triangular short teeth. *Corolla* like the calyx, but glabrous and fleshy. *Stamens* about 21; anthers linear, apiculate, nearly uniform, sub-sessile or on short broad flat filaments, sometimes slightly attached in groups of 3. *Female flower* probably solitary, much broader than the ♂. *Calyx* velvety outside and inside, divided nearly to the base into 4 ovate-triangular very acute lobes .4 in. long. *Corolla* fleshy, glabrous, .6 in. long, its

tube wide with staminodes like the anthers of the ♂ but not so numerous; limb about as long as the tube, with 4 deep, broad, sub-quadrate spreading lobes. *Ovary* ovoid-conic, densely rusty-pilose. *Stigmas* 4, oblong, fleshy, glabrous. *Fruit* unknown.

PERAK: *Scortechini* 476; *King's Collector* 5813.

34. *Diospyros CURTISII*, King & Gamble, n. sp. A tree (?); young branches rather thicker than a goose-quill, rugulose and dark-coloured when dry, glabrous. *Leaves* alternate, thinly membranous; oblong or oblong-elliptic, shortly and bluntly acuminate, base rounded or slightly cuneate; both surfaces glabrous, the upper olivaceous when dry, the lower brown; main-nerves 7 to 9 pairs, slightly curved, ascending, faint on both surfaces; the midrib prominent on the lower surface, slightly so on the upper; length 2.5 to 5 in., breadth 1.25 to 2 in.; petioles .2 in. *Male flowers* not seen. *Female flowers* .25 in. long, in extra-axillary or axillary fascicles of about 3 on the younger branches; pedicels about .2 in. long, cinerous-pubescent, each with 2 oblong obtuse bracteoles at its base, about .5 in. long. *Calyx* coriaceous, nearly .2 in. broad at the base, deeply divided into 4 triangular-reniform glabrescent lobes. *Corolla* partially glabrous, about as long as the calyx, salver-shaped; tube short; limb divided into 4 deep, broadly ovate, spreading lobes. *Staminodes* about 4, linear-lanceolate, compressed. *Ovary* narrowly oblong, tapering into the short thick style, densely tawny-tomentose. *Fruit* unknown.

PULAU POONGAH: *Curtis* 2942.

35. *Diospyros GLOMERULATA*, King & Gamble, n. sp. A tree 40 to 60 feet high; young branches rather thicker than a crow-quill, densely clothed with minute rufous pubescence. *Leaves* membranous, alternate; elliptic, shortly and bluntly apiculate, the base rounded or slightly cuneate; upper surface olivaceous when dry, glabrous; the lower brown, puberulous, midrib bold, main-nerves 5 or 6 pairs, slightly curved, ascending; length 2.25 to 3.5 in., breadth 1.25 to 1.75 in.; petiole about .1 in. *Male flowers* .2 in. long, crowded in dense sessile axillary and extra-axillary globular capitules 4 in. across. *Calyx* sessile, campanulate, tomentose, deeply divided into 4 broadly triangular sub-acute erect lobes. *Corolla* tubular, tetragonous, thick, about as long as the calyx, tube glabrous, the 4 lobes pubescent outside, oblong. *Stamens* 8, separate. *Anthers* broadly lanceolate, apiculate, filaments short. *Female flowers* and *fruit* not known.

PERAK: *King's Collector* 8590.

The following description of a *Diospyros* from Pahang is taken from Ridley's account of the Flora of the Eastern Coast of the Malay Peninsula.



36. *Diospyros caliginosa*, Ridley in Trans. Linn. Soc. Ser. 2, III. 318 (1893). A graceful lofty tree; bark black; branches pubescent. *Leaves* alternate, elliptic-oblong, acute; 8 in. long, 3 in. broad; main-nerves 13 pairs; glabrous above, minutely pubescent beneath on the midrib and nerves; petiole .25 in. long, minutely pubescent. *Flowers* on old wood, fascicled; peduncles short, covered with a black pubescence. *Calyx* of ♂ flower patelliform; sepals 4, broadly ovate, obtuse, covered without and on the margin with black hair. *Corolla* urceolate, white, silky, .5 in. long; lobes 4, short, ovate, recurved. *Stamens* 16, collected in pairs; filaments thick, minutely hispid; anthers glabrous, long-conical with acute tips. *Ovary* abortive, 4-lobed, irregular, the lobes furrowed; style conical. Flowers of ♀ not seen. *Fruit* small, globose, surrounded by the accrescent sepals.

PAHANG: in thick woods at Kota Glanggi and Kwala Tembeling, Ridley.

We are unable, having seen no specimen, to make quite sure of the place of this species. It seems to come very near to No. 17 *D. tristis*, King & Gamble.

### Order LXXIII. STYRACEÆ.

Trees or shrubs. *Leaves* alternate, simple; stipules none. *Flowers* in simple or branched axillary or terminal racemes or spikes, sometimes solitary; usually white, rarely red; bracts small, often minute or obsolete. *Calyx* gamosepalous, the tube more or less adnate to the ovary, so that it may be superior or inferior; limb 4-5-toothed or truncate, persistent. *Corolla* of 4 to 5 petals, the tube usually short, sometimes none, petals imbricate or sometimes valvate or contorted. *Stamens* adnate to the petals, equal in number to them or double or very many; 1-many-seriate; filaments free or connate; anthers round or linear, dehiscing laterally. *Ovary* inferior or superior, 2-5-celled or sometimes, by the separation of the septa, 1-celled; style filiform, sometimes thick; stigma capitate, entire or lobed, ovules 1 or more, on the inner angle of each cell, pendulous or erect. *Fruit* drupaceous, indehiscent, 1-, rarely 2-3-seeded. *Seeds* albuminous, testa thin or coriaceous, hilum generally broad; embryo straight or curved, cotyledons terete or flattened; radicle cylindrical or short.—DISTRIB. Warmer regions of Asia, Australia, and America, absent from Africa; genera 7 or 8, species about 350.

Stamens many, in several series .. ..	1. SYMPLOCOS.
Stamens 10, in one series .. ..	2. STYRAX.

1. SYMPLOCOS, Linn.

Trees or shrubs. *Leaves* alternate, often turning yellow when dry, entire or toothed. *Flowers* white, sometimes red, in axillary simple or compound spikes or racemes, sometimes in few-flowered fascicles, occasionally reduced to one flower; bracts small, solitary at the base of the pedicels; bracteoles 1 to 3, small, at the base of the flower. *Calyx-tube* adnate, short when in flower, campanulate, often enlarged in fruit; lobes 5, imbricate. *Petals* 5 in one series, or 6 to 10 in two series, free or somewhat connate, or sometimes connate in a tube, imbricate. *Stamens* adnate to the corolla, at the base of the petals or higher up the tube, numerous, many-seriate, the outer the longest; filaments filiform, or sometimes flattened; anthers short, dehiscing in longitudinal parallel cells. *Ovary* inferior, or semi-superior, 2-5-celled; style filiform; stigmas capitate, slightly lobed; ovules 2, pendulous from the inner angle of each cell. *Fruit* an oblong, ovoid or sub-globose drupe, endocarp woody or thin, often ridged or ribbed, 1-3-seeded. *Seeds* usually 1 only (by abortion), embryo terete, straight or curved, in the centre of fleshy albumen; cotyledons much shorter than the radicle.—  
DISTRIB Warmer regions of Asia, Australia and America, species about 290 to 300.

Filaments more or less pentadelphous; corolla-tube divided nearly to the base (Subg. I. HOPEA):—

Fruit (where known) more or less ampulliform; embryo curved (Sect. 1. PALURA).—

Inflorescence compound, branching at any rate at the base —

Branches of the inflorescence paniculately racemose, drupe nearly .5 in long .. .. 1 *S. odoratissima*.

Branches of the inflorescence racemose —

Racemes densely ferruginous-tomentose; pedicels scarcely .05 in. long, thick .. .. 2 *S. fulvosa*.

Racemes ferruginous-villous, pedicels .2 in. long, slender; leaves elliptic, under 4 in. long .. .. 3. *S. nira*.

Racemes pulverulent, pedicels .2 in long, slender; leaves obovate .. .. 4. *S. pulverulenta*.

Racemes glabrous or slightly pubescent; pedicels longer than .05 in., slender. —

Leaves over 4 in. long and 2 in. broad; calyx-lobes glabrous .. .. 5. *S. monticola*.

Leaves under 4 in. long and 1.5 in. broad; calyx-lobes pubescent .. .. 6. *S. fasciculata*.

Branches of the inflorescence spicate:—

Leaves beneath and inflorescence glabrous or nearly so; endocarp of seed thin .. .. { 7. *S. spicata*.  
var. *malasica*.

Leaves beneath and inflorescence ferruginous-villous; endocarp of seed hard, bony .. .. 8. *S. ferruginea*

- Inflorescence simple, racemose; racemes very short, almost reduced to fascicles .. .. 9. *S. Ridleyi*
- Fruit (where known) ovoid-oblong, not ampulliform; embryo straight (Sect. II. LODHRA).—
- Inflorescence paniculate, branching usually from the base only:—
- Branches of the inflorescence racemose, more than .5 in. long.—
- Leaves glabrous or nearly so; fruit glabrous:—
- Leaf-margins prominently broad-crenate, apex shortly and bluntly acuminate .. .. 10 *S. celastrifolia*
- Leaf-margins obscurely crenate or entire:—
- Leaf-margins prominently glandular, texture almost coriaceous .. .. 11 *S. adenophylla*
- Leaf-margins not glandular, texture chartaceous .. 12. *S. perakensis.*
- Leaves very hairy; fruit villous .. .. 13. *S. Brandiana*
- Branches of the inflorescence racemose, under .5 in long; leaf-margins entire or nearly so .. .. 14. *S. concolor.*
- Inflorescence unbranched:—
- Inflorescence racemose:—
- Racemes 2 to 3 in long, slender, few-flowered .. 15. *S. calycodactylos*
- Racemes very short.—
- Leaves coriaceous, acute or rounded or emarginate at apex, fruit ovoid oblong, under .5 in long .. 16. *S. ophirensis*
- Leaves chartaceous, long-acuminate at apex, cuneate at base, fruit cylindric-oblong, over .5 in. long .. 17. *S. Curtisi*
- Leaves chartaceous; fruit not known.—
- Leaves 6 to 7 in long, abruptly acuminate at apex, usually sub-cordate at base, quite glabrous .. 18. *S. crassipes*
- Leaves 4 to 7 in long, long acuminate at apex, rounded at base, ferruginous pilose beneath .. 19 *S. penangiana*
- Inflorescence spicate —
- Drupes large, over 1 in. in length; endocarp with 8 prominent sharp ridges; leaves nearly glabrous —
- Leaves usually under 6 in long and 2 in. broad; young inflorescence without prominent bracts .. 20 *S. cerasifolia*
- Leaves usually over 6 in. long and 2 in broad; young inflorescence prominently bracteate so as to appear strobilate .. .. 21. *S. rigida*
- Drupes small, under .5 in long; endocarp with faint ridges only; leaves rusty-pubescent beneath; young inflorescence strobilate .. .. 22. *S. rubiginosa*
- Filaments connate in a staminal tube; corolla-tube elongate (Subg. II. CORDYLOSTYF.).
- Corolla-tube scarcely 3 in. long .. .. 23. *S. confusa*
- Corolla-tube about 1 in long —
- Inflorescence densely rusty tomentose; leaves pubescent beneath .. .. 24. *S. Mangayi*
- Inflorescence slightly grey-pubescent; leaves glabrous .. 25 *S. Scortechinii.*

## Subgenus I.—HOPEA.

1. *SYMPLOCOS ODORATISSIMA*, Choisy ex Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 60 to 70 feet in height and 18 to 24 in. in diam. of stem; branches grey, stout, branchlets dark greyish-brown, angled, striate, minutely puberulous, leaf-buds acuminate, .15 in. long. *Leaves* thinly coriaceous; elliptic or elliptic-obovate or elliptic-oblong, shortly acuminate at apex, cuneate or slightly rounded at base; glabrous on both surfaces; margin entire or serrate, blackish-brown when dry; 3 to 6 in. long, 2 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 8 to 10 pairs, arching upwards to and along the margin where they meet in an intramarginal looped nerve near it; reticulations transverse, not prominent; petiole .4 to 6 in. long, flattened above. *Inflorescence* of grey-pubescent panicles, 1.5 to 2 in. long, axillary to the upper leaves, longer in fruit and stouter; branches paniculately racemose; bracts very small, deciduous; bracteoles 2, below the calyx-tube, ovate-acute, reflexed, .05 in. long; pedicels .15 in. long. *Calyx-tube* .05 in. long, pubescent; lobes 5, as long as tube, rounded. *Corolla-tube* very short; lobes ovate-obtuse, .15 in. long, pubescent on back, ciliate, white. *Stamens* in 5 bundles opposite corolla-lobes, very many, 80 to 100 in all, filaments slender; anthers rounded. *Ovary* villous; style thick, .075 in. long, stigma lobed; cells 3, ovules 2 in each cell. *Fruit* an ampulliform drupe, .4 to 5 in. long, 25 in. broad, lower part rounded, upper cylindrical, crowned by the calyx-rim and connivent lobes, the calyx-rim .075 in. broad, exocarp corky, rusty-brown, slightly pubescent; endocarp hard. *Seeds* 1 to 3, usually 1 only perfect, testa membranous, albumen fleshy; embryo slightly curved, .15 in. long, radicle long. Miq. Fl. Ind. Bat. I Pt. 2, 468; Koord & Val. Bijdr. VII. 148, Brand Monog. Sympl. 35. *Dicalyx odoratissimus*, Blume Bijdr. 1116.

PERAK: *King's Collector* 10030, 10411, 10777. SINGAPORE: *Ridley* 4428 (this latter specimen has leaves up to 8 in. long and 3.5 in. broad).—DISTRIB. Sumatra (*Beccari* 834), Java, Borneo (*Beccari* 4014).

This is var. *divaricata*, Brand, which seems to us hardly separable, unless by the leaves being almost entire. In the Java and Sumatra specimens of *G. odoratissima* the leaves are markedly serrate.

2. *SYMPLOCOS FULVOSA*, King & Gamble, n. sp. A very large tree, reaching 150 feet in height (Scortechini); branchlets dark-brown, young ones and innovations densely ferruginous-tomentose. *Leaves* chartaceous-coriaceous; elliptic, abruptly long blunt-acuminate at apex the acumen often curved, cuneate or attenuate at base; glabrous and shining above,

glabrous and dull beneath, ferruginous-brown when dry; margins faintly crenate-serrate, with a row of glands, slightly recurved; 3 to 4.5 in. long, 1.25 to 2 in. broad, midrib slender, slightly impressed above; main-nerves 6 to 8 pairs, the lowest pair close to the margin, the rest gradually more distant upwards, curved upwards to and along the margin where they meet in a looped intramarginal nerve; reticulations many, forming an elegant network; petiole .75 in. long. *Inflorescence* of tripartite sessile panicles of racemes, the racemes 1 to 2 in. long, densely ferruginous-tomentose; bracts and bracteoles minute, hidden in the tomentum; pedicels thick, .05 in. long; flowers white, then yellowish. *Calyx-tube* short; lobes very short, rounded, densely tomentose without. *Corolla-tube* short; lobes ovate-oblong, glabrous, .15 in. long, 3-5-nerved. *Stamens* many, obscurely separated in bundles; filaments slender; anthers very small rounded. *Ovary* and disk glabrous, style glabrous, .075 in. long, stigma capitate; cells 3. *Fruit* unknown.

PERAK: *Scortechini* 563, 567.

3. *SYMPLOCOS NIVEA*, Brand Monog. Sympl. 36 (1901). A tree, reaching 50 to 60 feet in height; branchlets slender, rounded, dark brown, glabrous; leaf-buds ovate-acuminate, tawny-pubescent. *Leaves* chartaceo-coriaceous; elliptic or elliptic-oblong, acute or acuminate at apex, cuneate at base; glabrous and shining above, glabrous and pale beneath, dark olive-brown when dry; margins obscurely undulate-crenate, recurved; 3 to 4 in. long, 1 to 1.75 in. broad; midrib slender, impressed above; main-nerves 5 to 6 pairs, irregularly spaced and often branched, at first straight then curved upwards to and along the margin where they anastomose in a looped intramarginal nerve, reticulations obscure; petiole slender, 3 to .4 in. long. *Inflorescence* an axillary panicle of villous racemes 2 to 3 in. long, the racemes 12-15-flowered; bracts and bracteoles ovate-lanceolate, villous, quickly caducous; pedicels slender, .2 in. long. *Calyx-tube* adnate to the ovary; lobes 5, oblong-obtuse, .1 in. long, glabrous, persistent. *Corolla* pure white; lobes twice as long as those of the calyx. *Stamens* about 60, as long as the corolla. *Ovary* glabrous, 1-celled, ovules apparently 2, style slender from a conical villous base. *Fruit* unknown.

PENANG: at Pulau Boetong, Government Hill and Muka Head, *Curtis* 715.

4. *SYMPLOCOS PULVERULENTA*, King & Gamble, n. sp. A tree (?); ultimate branchlets and inflorescence gray- or golden-pulverulent-scaly; leaf-buds lanceolate-acuminate. *Leaves* membranous; obovate, abruptly short acuminate at apex, cuneate often unequally at base; glabrous on both surfaces except on the nerves, olive-green when dry; margins

entire; 5 to 7 in. long, 2 to 3 in. broad; midrib slender, impressed above; main-nerves 8 to 9 pairs, curving upwards to and along the margin; reticulations transverse, prominent and slightly raised above; petiole .7 to .8 in. long, smooth, pulverulent-pubescent. *Inflorescence* of axillary panicles of racemes about 2 in. long; main rachis .7 in. long; branches sub-opposite, about 2 pairs, .5 to 1 in. long; bracts short, ovate, caducous, bracteoles 2, ovate-acute, under the calyx-tube, pedicels slender, .15 to .2 in. long; flowers yellow, buds globose. *Calyx-tube* funnel-shaped, .06 in. long; lobes 5, short, rounded. *Corolla-tube* short, lobes 5, ovate, obtuse, pulverulent-pubescent. *Stamens* very numerous, probably 200 at least, in 5 bundles opposite the corolla-lobes; filaments slender; anthers very small, rounded. *Ovary* and disk pubescent; style stout, stigma capitate; cells 2, ovules several. *Fruit* not known.

SINGAPORE: at Chanchukam, *Ridley* 4786.

5. *SYMPLOCOS MONTICOLA*, King & Gamble, n. sp. A shrub or small tree reaching 20 feet in height and 3 in. in diam. of stem; branchlets somewhat slender, pale brown, sinuous; leaf-buds small, acuminate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces, greenish-brown when dry; margins serrate except near the base, slightly recurved; 4 to 6 in. long, 2 to 2.5 in. broad, midrib slender, pale, impressed above; main-nerves 6 to 8 pairs, close near the base, gradually more distant, curved upwards to meet in a looped intramarginal nerve; secondary nerves few, reticulations transverse; petiole .25 in. long, channelled above. *Inflorescence* a fascicle of racemes either from the axils of leaves a little below the last, or from the new wood below them; racemes .5 to 1.5 in. long, 6-8-flowered, all parts nearly glabrous, bracts ovate, very minute; pedicels 0 to .1 in. long, bracteoles 2, ovate, acute, ciliate, .05 in. long, at the base of the calyx-tube. *Calyx-tube* short; lobes as long (.1 in.), thin, glabrous, round. *Corolla-tube* very short; lobes 5, thin, oblong, obtuse, .2 in. long, 3-nerved. *Stamens* many, more than 80, in 5 bundles opposite the corolla-lobes; filaments slender; anthers rounded. *Ovary* and disk glabrous or slightly pubescent; style short, .1 in. long; stigma capitate; cells 3. *Fruit* not known.

PERAK: *Scortechini* 533; *King's Collector* 3804, 6927, in dense jungle on the summits of mountains at 4,000 to 4,600 feet.

6. *SYMPLOCOS FASCICULATA*, Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 40 to 50 feet in height and 10 to 15 in. in diam. of stem; branchlets pale greyish-brown, slender, innovations greyish-pubescent. *Leaves* thinly chartaceous or membranous; oblong-lanceolate, long acuminate at apex, the acumen curved and mucro-

nate, rounded or obtusely rhomboid at base; glabrous and shining above, glabrous beneath except on the midrib, yellowish when dry; margins entire or obscurely and distantly serrate, slightly recurved; 2 to 4 in. long, .7 to 1.5 in. broad; midrib slender, impressed above, minutely pilose beneath; main-nerves about 5 to 7 pairs, indistinct, curved upwards and meeting in an intramarginal looped nerve rather distant from the margin; secondary nerves and reticulations slender, obscure; petiole .2 in. long, bordered above by the decurrent margin of the blade and minutely pilose. *Inflorescence* a short fascicle of axillary cymes or racemes .5 to .7 in. long, ashy-pubescent; bracts very minute, pedicels slender, .15 in. long; bracteoles 3, minute, ovate, acute, ciliate. *Calyx-lobes* 5, rounded, obtuse, .05 in. long, pubescent without. *Corolla-lobes* oblong, obtuse, .1 to .15 in. long, glabrous, 5-nerved; tube very short or almost none. *Stamens* in 5 bundles opposite the corolla-lobes, about 20 to 25 or sometimes more; filaments slender, outer ones exsert; anthers minute, rounded, emarginate. *Ovary* depressed at top, disk glabrous, cells 3; style slender, .075 in. long, ending in a flattened 3-lobed stigma. *Fruit* an ampulliform drupe, ovoid below for .2 in. in length, 15 in. in diam., glabrous, 5-6-ribbed, tipped by a cylindric beak .05 in. long and by the persistent calyx-lobes; exocarp thin, endocarp hard, furrowed, furnished within with 3 to 6 strong ribs, enclosing a much-lobed seed; testa thin; albumen fleshy; embryo very slightly curved, .15 in. long. Miq. Fl. Ind. Bat. I. Pt. 2. 467; Clarke in Hook. f. Fl. Br. Ind. III. 574, Koord. & Val. Bijdr. 7. 150; Brand Monog. Sympl. 34. *Dicalyx tinctorius*, Bl. Bijdr. 1116.

PENANG: Curtis 3171. PERAK: Wray 1865, 2418, 2466, 2739, 3561; *Scortechini* 128, 1527; *King's Collector* 1042, 2021, 3003, 4739, 5175, 5337, 10525. SELANGOR: *Ridley* 8209. MALACCA: *Mungray* (K.D.) 958, *Griffith* (K.D.) 3665, *Holmberg* 867. JOHORE: *G. King*. SINGAPORE: *Murton* 143; *Ridley* 3626A, 8209.—DISTRIB. Sumatra (*Forbes* 2355, 2358, 2563, 2812); Java (*Forbes* 218); Borneo (*Beccari* 2380, *Haviland* 1024, 1545).

After a great deal of trouble the seed with albumen and embryo were separated. The walls of the shell of the fruit are furnished inside with projecting ribs, so that the seed resembles that of a small walnut and the embryo is slightly curved, long and narrow, and might be called straight. Koorders & Valetton's description is thus confirmed.

7. SYMPLOCOS SPICATA, Roxb. Hort. Beng. 40 (1814), and Fl. Ind. II 541; Wall. Cat. 4417; A.D.C. Prod. VIII. 254; Wight III. t. 150; Miq. Fl. Ind. Bat. I. Pt. 2. 465; Bedd. Fl. Sylv. Madr. cxlix, Brandis For. Fl. 300; Kurz in Journ. As. Soc. Beng. XLVI. ii. 239 and For. Fl. II. 146, Clarke in Hook. f. Fl. Br. Ind. III. 573, Trimen Fl. Ceyl. III. 104,

Cooke Fl Bomb II 108, Koord & Val Bijdr VII 144 *S polycarpa*, Wall Cat 4423, DC 1c 255, Kurz II c *S Loha*, Don Prod 144, DC 1c 255 *S racemosa*, Wall Cat 4418 (*in part, not of Roxb*)

VAR *malasica*, Clarke in Hook f Fl Br Ind III 573 A small tree with spreading branches, reaching 30 to 40 feet in height and 1 foot in diam of stem, branchlets dark grey brown smooth, innovations glabrous, buds lanceolate acuminate Leaves coriaceous chartaceous, alternate, elliptic- or oblong lanceolate, acute or acuminate at apex, cuneate at base, entire or serrate, glabrous on both surfaces, turning yellow when dry, margin distinctly and slightly denticulate, glandular, 4 to 7 in long, 1.5 to 2.5 in broad, midrib thick impressed above, main nerves about 10 pairs, irregular, curved upwards and branching towards the margin, secondary nerves few, reticulations prominent on the under surface, petiole 4 to 7 in long, channelled above Inflorescence an axillary panicle of spikes, the branches mostly near the base, spikes 1.5 to 4 in long, glabrous or slightly pubescent, bracts very small, deciduous, bracteoles under each flower 3, ovate, acute or obtuse, ciliate, .05 in long Calyx-lobes 5, rounded, imbricate glabrous, tube as long as lobes, the latter .05 in long Corolla 5 lobed, white or yellowish, tube very short, lobes ovate orbicular, 1 to 1.5 in long Stamens indefinite, about 40, the outer ones longer than the petals, inserted on the corolla tube, filaments slender, anthers short, rounded Ovary inferior, 3 celled, ovules 3 to 4 in each cell, style thick, 1 in long, stigma capitate Fruit a globose drupe 1.5 to 2 in long, surmounted by a rim formed by the short calyx lobes, smooth, olive coloured, exocarp and endocarp thin, ribbed Seed 1, testa thin, albumen rather scanty embryo curved

PERAK Wray 2798, *Scortechini*, King's Collect 6299 6903  
MALACCA Griffith, *Mangay* (K D) 957, Derry 506

VAR *acuminata*, Brand Monog Sympl 40 Leaves long acuminate blunt at the tip, serrulate, 3 to 5 in long, 1 to 2 in broad, main nerves 7 to 8 pairs, all nerves and reticulations, except the impressed midrib prominent on the upper surface in young leaves Flowers sometimes pedicellate Fruit somewhat urceolate, ribbed *Symplocos acuminata*, Miq Fl Ind Bat I Pt 2 467 *Dicalyx acuminatus*, Bl Bijdr 1119

PERAK *Scortechini* 1556 — DISTRIB Java, Sumatra (*Forbes* 3208)

VAR *attenuata*, Clarke in Hook f Fl Br Ind III 573 Leaves long acuminate at apex, long attenuate at base, 3 to 4 in long, 1 to 1.25 in broad, margins serrate Spicate branches of the inflorescence slender, usually short Fruit small, often only 1 to 1.5 in in diam



*S. attenuata*, Wall Cat 4426, A. DC Prod VIII 256, Brand Monog. Sympl 39

KEDAH. *King's Collector* 1764 —DISTRIB. Assam, Burma

8 SYMPLOCOS FERRUGINEA, Roxb Hort. Beng 40 (1814), Fl Ind II 542 A tree with spreading branches reaching 50 to 60 feet in height and 1 foot in diam of stem, branchlets stout, dark brown, smooth, innovations densely ferruginous-villous. Leaves coriaceous, elliptic or elliptic-lanceolate, acuminate at apex, cuneate at base, glabrous and shining above, ferruginous-villous especially on the nerves beneath, turning yellow when dry, margins serrulate, denticulate or almost entire, recurved, 5 to 8 in long, 1.5 to 3 in broad, midrib stout, very prominent beneath, impressed above, main-veins 12 to 14 pairs, prominent beneath, parallel at first and straight for some distance then arching near the margin, secondary veins few reticulations obliquely transverse, not prominent, petiole 3 to 5 in long, densely rusty-villous, thick. Inflorescence an axillary panicle of spikes, 2 to 6 in long, the spikes and panicle short in bud, longer in flower, much elongated in fruit, the branches of the panicle mostly near the base, densely ferruginous-villous, bracts very small, ovate acute, villous, bracteoles under each flower 3, the central one 12 in long ovate acuminate, the two outer shorter, ovate acute, the three together as long as the calyx. Calyx 5 lobed, lobes ovate obtuse, 1 in long, pubescent without. Corolla 5 lobed, white, rotate, tube .05 in long, lobes 1 in long, oblong obtuse, 3 nerved. Stamens indefinite, 40 to 70, in 5 fascicles inserted on the corolla tube, filaments slender, gradually increasing in length from the inside outwards, the outer ones a little longer than the petals, anthers rounded, short. Ovary depressed, disk glabrous, cells 3, style thick, 1 to 2 in long, stigma 3 lobed, ovules several in each cell. Fruit a globose or ampulliform drupe, faintly ribbed, 1.5 to 2 in long, surmounted by the persistent calyx with enlarged connivent teeth, exocarp thin, endocarp very hard, bony, about 12-14 ribbed, globose below, cylindric and very short above. Seed 1, testa thin, albumen rather scanty, embryo curved, 1 to 1.5 in long. Wall Cat 4412, A. DC Prod VIII 257, Miq Fl Ind Bat I Pt 2 466, Clarke in Hook f Fl Br Ind III 574 (var *exc*), Kooid & Val Bijdr VII 141, Brand Monog Sympl 40. *S. mollis*, Wall Cat 4433 G. Don Gen Syst IV 3. *S. Verhulstii*, Jungh & de Vriese Pl Nov Ind Or 12, Miq l.c. 467. *S. javanica*, Kurz in Journ As Soc Beng XLVI ii 239 (syn. *S. rubiginosa* *exc*) and For Fl II 145. *S. lachnobotrya*, and *S. Horsfieldiana*, Miq Fl Ind Bat Suppl 475. *Dicliptera javanica*, Blume Bijdr 1117

PENANG Wallich 4433, Phillips, Curtis 206, King's Collector

1353. PERAK Wray 3387, *Scortechini* 900, *King's Collector* 925, 4376, 4395, 4683, 5235, 6219, 7091, 8646, 11019 PAHANG *Ridley* in *Trans Linn Soc Ser. 2, III* 318 MALACCA *Maingay* (K D) 956 —  
DISTRIB. Assam, Burma, Java (*Forbes* 682, 798, 861, 1203), Sumatra (*Forbes* 2614, 2691, 3150, *Beccari* 842), the Moluccas, the Philippines, and S China

The leaves in this species are very variable, for instance, those of *King's Collector* Nos 4395, 4683 have oblong lanceolate leaves 6 to 8 in long and about 2 in broad with more distant nerves, and are nearly glabrous beneath, but some of the leaves approach very nearly to those of other specimens, and we cannot therefore separate it as a variety. The marked elongation of the fruiting inflorescence is another source of difficulty in superficial identification

9 SYMPLOCOS RIDLEYI, King & Gamble, n sp. A medium sized tree, branchlets glabrous, angled, striate, leaf buds acuminate, glabrous. *Leaves* coriaceous, ovate or oblong, acuminate at apex, attenuate at base, glabrous on both surfaces, shining above, greenish-yellow when dry, margins entire or remotely and faintly denticulate, recurved, 3 to 4 in long, 1 to 1.5 in broad, midrib slender, raised above, main nerves 8 to 9 pairs, raised on both surfaces, straight, meeting in a looped intra-marginal nerve, secondary nerves few, reticulations prominent, raised above, petiole 3 in long, channelled above. *Inflorescence* of sessile or very short few flowered axillary racemes, as long as the petiole, rachis silky pubescent, bracts and bracteoles orbicular, ciliate, pubescent, pedicels none or very short. *Calyx lobes* orbicular, thin, ciliate, 1 in broad, concave, tube very short. *Corolla tube* very short, lobes ovate, 12 to 15 in long, 3-5 nerved, white. *Stamens* about 50, in bundles opposite the corolla lobes, filaments slender, the outer ones a little longer than the corolla lobes, anthers rounded. *Ovary* villosa, 3 celled, ovules 2 in each cell, disk glabrous, style thick, 1 in long, stigma capitate, lobed. *Fruit* not known

SINGAPORE *Ridley* 5684

A species very closely allied to *S. phyllocladys*, Clarke, of N India and China and to *S. japonica* A DC of Japan

10 SYMPLOCOS CELASTRIFOLIA, Griff MS, Clarke in Hook f Fl Br Ind III 575 (1882). A tree (?), branchlets smooth, slender, glabrous. *Leaves* chartaceous, elliptic or elliptic-oblong, shortly and bluntly acuminate at apex, cuneate at base, glabrous on both surfaces, greenish-brown above, yellowish beneath when dry, margins crenate, slightly recurved, 2.5 to 5 in long, 1.5 to 2.25 in broad, midrib slender, impressed above, main-nerves 6 to 8 pairs, irregular, not prominent, at first straight, then curving upwards and branching to meet

near the margin in an intramarginal network; reticulations obscure; petiole .2 to .3 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a few- and basally-branched pubescent panicle of long slender racemes, 2.5 to 3 in. long; racemes 12-16-flowered; pedicels .1 in long; bracteoles 2, lanceolate, .05 in. long, ciliate, pubescent. *Calyx-tube* .05 in long, lobes 5, oblong, obtuse, .075 in. long. *Corolla* white, sweet-scented, tube very short; lobes ovate-oblong, 2 in. long. *Stamens* in 5 bundles opposite the corolla-lobes, 40 to 70, the outermost the longest and equal to the corolla-lobes. *Ovary* depressed, disk glabrous; cells 3, style 1.25 in long, stigma capitate. *Fruit* an ovoid-ellipsoid drupe, .25 in. long, smooth, tipped with the rim and erect teeth of the persistent calyx. *Seeds* 1 to 3, testa membranous; embryo slender, straight, .1 in long. Brand Monog Sympl. 48.

PENANG *Curtis* 3459. MALACCA: *Griffith* (K.D.) 3651.—DISTRIB. Borneo (*Teysmann*, *Motley*, *Beccari* 2374, *Haviland* 509B, 1642, 3706).

11 SYMPLOCOS ADINOPHYLLA, Wall. Cat. 4427 (1829). A tree reaching 50 to 60 feet in height, stem 15 to 20 in. in diam; branchlets dark brown, smooth, upper parts and innovations dark rusty-glandular-pubescent. *Leaves* chartaceo-coriaceous, narrowly lanceolate to elliptic-lanceolate and elliptic; obtusely long caudate-acuminate at apex, cuneate or attenuate at base; glabrous on both surfaces, shining or not, olive-brown or dark reddish-brown when dry, margins crenate or subentire, the crenatures with large glands, sometimes recurved, .3 to .5 in. long, .7 to 1.5 in. broad; midrib slender, impressed above, main-nerves 5 to 8 pairs, distant, arching upwards to join in a looped intramarginal nerve at about two-thirds of the distance to the margin; secondary nerves and reticulations obscure; petiole 3 to .5 in long, often bent. *Inflorescence* a 3- and basally-branched axillary panicle of racemes, glandular-rusty-pubescent, 1 to 2 in long, racemes about 12-flowered, bracts ovate-acute, caducous, pedicels .05 to .1 in long, bracteoles minute, thin, obtuse. *Calyx-tube* glabrous or minutely pubescent, .05 in long; its teeth very minute, triangular or rounded, rusty-pubescent. *Corolla* yellowish-white, tube short; lobes oblong, rounded, about .15 in. long, incurved at tip. *Stamens* 40 to 50, in 5 bundles opposite the corolla-lobes, outer ones as long as those lobes; filaments slender; anthers small, rounded. *Ovary* depressed, disk glabrous, cells 3, style slender, 1 in. long, stigma capitate. *Fruit* an oblong-cylindrical or ellipsoid drupe .3 to .35 in. long and half as broad, smooth, pale yellowish-brown, crowned with the minute, inconspicuous, much-incurved, persistent calyx-teeth; exocarp smooth, thin, endocarp bony, ribbed. *Seed* 1; embryo straight, pendulous. G. Don Gen. Syst. IV. 3, A. DC. Prod. VIII. 257, Miq. Fl. Ind. Bat. I. Pt. 2, 466;

Clarke in Hook f Fl Br. Ind III 575, Brand Monog. Sympl 48, Stapf in Trans Linn Soc 2nd Ser IV 204 *S. stenophylla*, Miq Fl Ind Bat Suppl 476, Brand l c *S. bancana*, Miq l c

KEDAH Ridley 5523 PENANG Wallich 4427A, Maingay (K D) 959, Curtis 402, 445 PERAK Wray 1119, 3842, 3925, 4123, *Scortechini* 490, King's Collector 1269, 2606, 6873 SLLANGOR Ridley 7553, 8549 MALACCA Griffith (K D) 3649 SINGAPORE Wallich 4427B, G Thomson, Hullett 828, Walker 255, Ridley 3635A, 3809 — DISIRIH Sumatra (Beccari 147), Bangka (Horsfield 39), Borneo (Buccari 2115, Lobb, Haviland 1187)

A variable species as regards the leaves and the length of the inflorescence, the prominent glands on the margins of the leaves are a noticeable character

12 SYMPLOCOS PERAKENSIS, King & Gamble, n sp A tree with spreading branches reaching 50 to 60 feet in height, stem 15 to 20 in in diam, branchlets dark brown, very slender Leaves chartaceous, elliptic, long caudate acuminate at apex, cuneate at base, glabrous on both surfaces, green when dry, margins entire, recurved, 2 to 3.5 in long, 1 to 1.5 in broad, midrib slender main nerves 6 to 7 pairs, the two lowest near the margin and produced upwards along it, the others curved upwards to meet in a looped intramarginal nerve, which is rather prominent secondary nerves and reticulations obscure, petiole 2 in long, channelled above Inflorescence a sessile 3 branched panicle of racemes axillary to the upper leaves or on the branchlets below them, 1 to 2 in long or less, panicle branches and racemes very slender, the latter about 8-10 flowered, rachis grey pubescent, 1 bract and 2 bracteoles, ovate acute, scarcely 0.5 in long, persistent, pedicels about 0.5 in long Calyx tube short, lobes 5, rounded, grey pubescent, ciliate, 0.5 in long, as long as tube Corolla tube short, lobes oblong, white, 1.25 in long Stamens about 40, in 5 bundles opposite the corolla-lobes, filaments slender, exsert, anthers rounded, minute Ovary villous cells 3, style rather thick, villous, 1 in long, stigma small Fruit a cylindrical glabrous drupe, 4 to 5 in long, .25 in in diam, the top rusty hirsute and crowned by the persistent rusty hirsute calyx lobes, the calyx rim 1 in broad, exocarp fleshy, endocarp hard, bony Seeds 3, testa rather thick, embryo straight

PERAK *Scortechini* 646, Wray 2593, 2944, King's Collector 4446 4570, 4586, 7863, 10163, 10501, 10515, 10801, 10985 SFLANGOR Ridley 10223

This species is very near to *S. adenophylla*, but the leaves are entire much thinner and smaller, and not glandular and the inflorescence is more compound more slender grey and not rusty pubescent and has rounded calyx lobes

white, oblong-obtuse, 2 in long, 5-nerved *Stamens* in bundles of 6 to 12 each opposite the corolla-lobes, 30 to 60 in all, filaments slender, outer as long as petals, anthers rounded, very small *Ovary* and disk nearly glabrous at top, style slender, 15 to 2 in long, stigma capitate, cells 3, ovules 2 in each cell *Fruit* ovoid cylindric, blueish-purple when ripe, 3 to 4 in long, 2 in broad, surmounted by calyx rim with patent lobes, nearly as wide as the top of the fruit, exocarp crustaceous, endocarp very hard, bony, obscurely ribbed and irregularly indented *Seed* 1, testa membranous, albumen fleshy, embryo straight Brand Monog Sympl 58 *Symplocos* No 42, Herb Ind Or Hook f. & Th

PERAK on Gunong Bubu, 5,000 feet, Wray 3919, *Scortechini*  
MALACCA on Mount Ophu, Griffith (K D) 3650, Ridley 10083, Derry 623, Lobb

The specimens of Wray and Scortechini have the leaves rounded at both ends, but there seems no reason to keep them as a separate variety from the specimens from Mount Ophu which are acute at apex and cuneate at base

17 *SYMPLOCOS CURTISII*, Oliv in Hook Icon t 1757 (1888) A shrub or small tree, reaching 10 to 15 feet in height, branchlets slender, pale brown, glabrous, leaf buds small, acuminate, pubescent *Leaves* chartaceous elliptic, abruptly long acuminate at apex, cuneate at base, glabrous on both surfaces, pale greenish brown when dry, margins obscurely denticulate, slightly recurved, 4 to 9 in long, 1.5 to 3 in broad, midrib slender, raised beneath, impressed above, main nerves 5 to 7 pairs, the lowest pair very near the margin, the rest gradually more and more distant, all curving upwards to and along the margin where they form an intramarginal looped nerve, secondary nerves very few or none, reticulations transverse, fairly prominent, rather distant, petiole 2 to 4 in long, channelled above *Inflorescence* of short (up to 4 in long) racemes axillary to the upper leaves or on the young wood below them, racemes about 5 flowered, bract ovate acute, 1 in long, keeled, villous, bracteoles 2, similar but smaller, pedicels stout, about .05 in long *Calyx tube* about 1 in long lobes 5, ovate, obtuse, as long as tube, all minutely pubescent without *Corolla tube* very short, lobes elliptic oblong, 2 in long, 5-nerved, white *Stamens* many, 60 or more, filaments slender, longer than corolla lobes, anthers rounded, minute, staminal bundles only noticeable in bud *Ovary* villous, disk glabrous, style slender, 2 in long, stigma capitate, cells 3, ovules 2 in each cell *Fruit* a cylindric oblong berry, bright blue when ripe, 5 to 8 in long, somewhat constricted at about one third distance from the top, the top surmounted by the calyx rim and connivent teeth, exocarp

crustaceous, endocarp woody, cells 1 to 3 Seed usually 1, testa membranous, albumen fleshy, embryo straight Brand Monog Sympl 69

PENANG *Curtis* 1099 PERAK *Wray* 692 2830, *Scortechini* 328, 646, 1423, *King's Collector* 2084, 2099, 2406, 8431

18 SYMPLOCOS CRASSIPES, Clarke in Hook f Fl Br Ind 'III 580 (1882) A tree (?), branchlets stout, smooth, grey Leaves stoutly chartaceous, large, elliptic lanceolate, abruptly acuminate at apex, subcordate or obtusely rhomboid at base, glabrous on both surfaces, margins subentire, slightly recurved 6 to 7 in long, 2 to 3 in broad midrib prominent, thick, main nerves 10 to 12 pairs, irregular and at irregular angles, usually only slightly curved upwards to meet in a looped intramarginal nerve 25 in from margin, secondary nerves and few transverse reticulations prominent, petiole very stout, 15 to 2 in long Racemes axillary, 4 flowered, pedicels very small, 1 in long at most, bracts ovate acute, like the rachis and calyx densely ferruginous pubescent Calyx tube very short, lobes ovate, 0.75 in long Corolla tube short, lobes 1 to 15 in long, oblong obtuse Stamens about 30 slightly exsert Ovary 3 celled, disk fulvous pilose Fruit not known Brand Monog Sympl 52

MALACCA on Mount Ophir, *Murray* (K D) 960

19 SYMPLOCOS PINANGIANA, King & Gamble, n sp. A small tree (?), branchlets rounded, upper ones and innovations densely dark ferruginous hirsute Leaves chartaceous, lanceolate, long acuminate at apex, somewhat rounded at base, glabrous above, sparsely pilose beneath with long stiff ferruginous hairs especially on and along the nerves greenish brown when dry margins distinctly but sharply serrate in the middle part, entire on the acumination and near the base, revolute 4 to 7 in long, 1 to 1.25 in broad, midrib prominent beneath impressed above, main nerves 4 to 6 pairs, irregularly distant, curving upwards and meeting about 2 in from the margin in a looped intramarginal nerve, secondary nerves and transverse reticulations scanty but prominent, petiole short, 15 in long, stout, hirsute Inflorescence a sessile very short raceme or panicle of flowers on the young branches bracts several, very small, densely rusty hirsute Calyx tube short lobes 5, oblong, obtuse, 1.25 in long glabrous within, densely rusty hirsute without Corolla tube short, lobes 5, oblong rounded, 2 in long Stamens about 30, filaments slender anthers rounded Ovary villous style slender, pubescent, 15 in long stigma capitate Fruit unknown

PENANG at West Hill, 2500 feet *Curtis* 325

20 SYMPLOCOS CERASIFOLIA, Wall Cat 4434 (1829) A tree, reaching 60 feet and even 80 feet in height, stem with a diam of 20 in branchlets glabrescent, smooth, somewhat angled, reddish brown, leaf

buds nearly globose, scales rounded, acuminate *Leaves* coriaceous-chartaceous, oblong or elliptic-oblong, acuminate at apex, cuneate or attenuate at base, glabrous above, sparsely pilose on the nerves beneath otherwise glabrous, dark greenish-brown when dry, margins crenately serrate except at the very base and on the acumination, slightly recurved, 5 to 7 in long, 1 to 2 in broad, midrib slender, impressed above, main nerves 6 to 8 pairs, conspicuous, at once curving upwards and round to join each other in a well marked looped ring 2 to 3 in from the margin, reticulations transverse, petiole 5 to 7 in long, slender, channelled above *Inflorescence* of axillary and sub terminal pubescent spikes, the rachis stout, angular, bracts broad, round, villous, early caducous, bracteoles 2, ovate-acute, 0.75 in long, villous, flowers about 12 in each spike *Calyx tube* short, 0.5 in long, lobes lanceolate, acute, pilose, 1.25 in long *Corolla tube* short, lobes oblong acute, 3 nerved, 2 in long *Stamens* about 30, or very numerous—over 100 (Scortechini), on the corolla-tube, fascicles not well separated, filaments very slender, anthers rounded, very minute *Ovary* and disk slightly hairy, style slender, curved, 2 in long, stigma capitate, cells 3, ovules 2 to 3 in each cell *Fruit* a cylindric oblong drupe 1.5 to 2 in long, 1 in broad, truncate at both ends and tipped above by the persistent calyx tube and lobes, the rim about 2 in broad, smooth, yellowish brown, exocarp thick, corky, endocarp woody with 7 to 8 sharp stri like ridges *Seed* 1, testa membranous, albumen thin, embryo straight, pendulous, radicle long A DC Prod VIII 257, Clarke in Hook f Fl Br Ind III 580 Miq Fl Ind Bat I Pt 2 466, Brand Monog Sympl 52 *Bobua cerasifolia*, Miers in Journ Linn Soc XVII 304

PINANG Wallich 4424, Curtis 1503, 3096 PERAK Wray 145, 3003, Scortechini 515, King's Collector 6283, 6950 MALACCA Mangay (K D) 962

Scortechini considered his No 515 to represent a species separate from *B. cerasifolia* but with a large series of specimens before us we find it difficult to agree to this.

21 SYMPLOCOS RIGIDA, Clarke in Hook f Fl Br Ind III 581 (not of Wall) (1882) A tree with spreading branches, reaching 60 to 80 feet in height and 18 to 24 in in diam of stem, branchlets stout, dark brown, glabrous, angled when dry, marked with the prominent round raised scars of fallen leaves, branch buds large, covered with oblong glandular seriate stipular scales, softly silky on the back, leaf buds acuminate, 3 to 5 in long, silky pubescent *Leaves* coriaceous-chartaceous, oblong or oblong-lanceolate, acute or shortly acuminate at apex, attenuate at base, glabrous on both surfaces

and usually shining, dark greenish-brown when dry, margins entire or very shortly serrate, recurved when dry, 6 to 12 in long, 2.5 to 5 in broad, midrib stout, much raised beneath, impressed above, main-nerves 10 to 13 pairs, raised beneath, curving upwards to and along the margin, secondary nerves few or none, reticulations transverse, parallel, not prominent, petiole 7 to 13 in long, stout, glabrous. *Inflorescence* of simple spikes, strobilate when young and scarcely 5 in long, in flower 1.5 to 2 in. long with pubescent rachis, in fruit reaching 3 in long with stout nearly glabrous rachis, in the axils of upper leaves or the young branchlets below them, bracts broadly ovate, acute, concave, minutely grey or tawny-pubescent, bracteoles 2, lanceolate acute, 1 in long, all early deciduous, buds ovoid, grey pubescent. *Calyx tube* 0.75 in long, lobes 4, ovate acute, blunt, 1 to 1.5 in long, both grey pubescent. *Corolla tube* short, lobes 5, white, oblong, acute, 2.5 in long, 5 nerved. *Stamens* in 5 bundles opposite the corolla lobes, about 60, filaments very slender, outer ones longer than corolla-lobes, anthers rounded, minute. *Ovary* and disk glabrous, style curved, 2.5 in long, stigma capitate, cells 3, ovules 2 in each cell. *Fruit* ovoid oblong, 1 to 1.5 in long, .75 to 1 in broad, waxy greenish-white when half ripe, dark blue when ripe, pale brown, shining, smooth, obscurely angled when dry, surmounted by the calyx rim 1.5 in broad with erect calyx teeth, exocarp thick, fleshy, endocarp very hard, woody, with 8 sharp star like ridges, cells 3. *Seeds* 1 to 3, testa thin fibrous, albumen fleshy, embryo straight, radicle long. *Blind Monog Symp* 52. *Doromma rigidum*, Miers in *Trans Linn Soc Ser 2 Bot I* 104. *Barringtonia rigida*, Clarke in *Hook f Fl Br Ind II* 510.

*PERAK* Way 1294, 3207, *Scortechni* 2046, *King's Collector* 4246, 4277, 4613, 5045, 5048, 6095, 6179, 7260, 7898, 8543, 10013. *SELANGOR* *Ridley* 10544. *MALACCA*. *Murray* (K D) 767, 965. *SINGAPORE* *Cantley* 50, *Ridley* 1798, 5960.

22 *SYMPLOCOS RUBIGINOSA*, Wall Cat 4432 (1829). A large shrub or a tree sometimes reaching 70 to 100 feet in height and 15 to 20 in or more in diam of stem, branches stout, grey, nearly glabrous, branchlets stout, angled, glabrous or cinnameous or ferruginous hirsute, leaf buds lanceolate, 3 to 4 in long. *Leaves* coriaceous chartaceous, obovate-oblong, acute or shortly and abruptly acuminate at apex, cuneate at base, glabrous above, pubescent especially on the nerves beneath, the pubescence pale rusty brown, pale greenish-brown when dry, margins shortly dentate especially on the upper half, sometimes nearly entire, recurved, 5 to 11 in long, 2 to 4 in broad, midrib stout, prominent beneath, impressed above, main



nerves 10 to 13 pairs, parallel, very prominently raised beneath and usually impressed above, curving upwards to and along the margin, secondary nerves few or none, reticulations many, prominent, transverse, parallel, petiole thick, densely pubescent, 5 to 1 in long Inflorescence of simple erect spikes, from the axils of upper leaves or from the young branchlets below them, spikes 1 to 2 in long, softly cinnamomeous pubescent, the rachis stout especially in fruit flowers about 12 to 16 in each spike, each flower supported by a broad ovate rounded bract 175 in long and two ovate acute bracteoles 1 in long Calyx lobes ovate lanceolate, acute, 06 to 07 in long, tube as long as lobes Corolla tube short, lobes white, oblong, 15 in long, 3 nerved, glabrous Stamens in 5 bundles opposite to the corolla lobes, usually about 30, filaments unequal, the outer ones longer than the corolla lobes, anthers minute, round Ovary and disk glabrous, style slender, about 15 in long, stigma capitate or lobed, cells 3 Fruit an ovoid oblong drupe, 4 in long, 25 in broad surmounted by the calyx rim 1 in in diam, pale brownish yellow when dry, glabrous or softly pilose exocarp thin crustaceous, fragile endocarp woody, faintly ridged, seeds usually 3 A DC Prod VIII 257 Miq Fl Ind Bat I Pt 2 466, Clarke in Hook f Fl Br Ind III 580, Brand Monog Sympl 53 *Lodhia rubiginosa*, Miers in Journ Linn Soc XVII 299

PENANG Wallich 4432 Curtis 528, 1692 G King PFRAH  
*Scortechini* 1825 King's Collector 5192, 5771, 7112, 8105, 10015, 10021  
 MALACCA Maingay (K D) 955 Griffith (K D) 3652 JOHORL Ridley  
 11115 SINGAPORE Cantley 72 Ridley 4117 — DISTRIB Sumatra  
 (Forbes 1991), Borneo (Beccari 1216, Harms 1679 3480)

#### Subgenus II — CORDYLOBIASTI

23 SYMLOCOS CONIUSA, Brand Monog Sympl 88 (1901) A shrub, 5 to 8 feet high (Lobb), branchlets rough, dark brown marked with prominent cushion like scars, uppermost ones and innovations ferruginous pubescent Leaves chartaceous variable in shape, elliptic-oblong to ovate lanceolate bluntly acute at apex, attenuate often unequally at base, margins entire or slightly undulate recurved glabrous on both surfaces 3 to 4 in long, 15 to 2 in broad, midrib slender main nerves irregular about 6 pairs, secondary nerves and reticulations also irregular, indistinct petiole 2 to 3 in long, slightly pubescent Inflorescence of very short, 1-4 flowered, axillary grey silky racemes about 25 in long, bracts very small, ovate acute, bracteoles also minute, 2 to each pedicel, pedicels 05 to 1 in long flowers white, sweet scented Calyx-tube

campanulate, grey-silky, 1 in long, lobes 5, short, rounded, ciliate  
*Corolla-tube* funnel-shaped, 2 to 3 in long, glabrous, lobes 5, oblong,  
 obtuse, spreading, 15 in long *Stamens* very many (40 to 60), inside a  
 staminal tube somewhat longer than the corolla tube, filaments very  
 short, slender, anthers small, rounded *Ovary* and disk villous, style  
 slender, hirsute or glabrescent, 3 to 5 in long stigma large, capitate  
*Fruit* not known  $\delta$  *Henscheli*, Benth & Hook f ex Clarke in  
 Hook f Fl Br Ind. III 588, Forbes & Hemsl in Journ Linn Soc  
 XXVI 73

MALACCA on Mount Ophir, *Griffith* (K D) 3644, *Lobb*, *Main jay*  
 (K D) 954 —DISTRIB Borneo (*Buccari* 2405), China

This species, which in the Fl Br Ind was placed under  $\delta$  *Henscheli* has been  
 separated by Brand who considers the true  $\delta$  *Henscheli* (*Cordylobolus Henscheli*,  
 Moritz in Bot Zeit vi 604 (1848) to be a Java plant only It is not thought neces-  
 sary to maintain Clarke's var *hirsutulus*

24 SYMPLOCOS MAINGAYI, Benth ex Clarke in Hook f Fl Br Ind  
 III 588 (1882) A tree with spreading branches reaching 40 to 60  
 feet in height and 10 to 15 in in diam of stem, branches stout,  
 light brown, branchlets and innovations densely ferruginous-velvety  
 pubescent *Leaves* chartaceous, elliptic oblong, shortly acuminate  
 at apex, broadly attenuate or rounded at base, glabrous or with a  
 few scattered hairs above, sparsely pubescent beneath except the  
 nerves which are hirsute, marked also beneath by numerous faint  
 transverse lines, margins entire, 4 to 6 in long, 2 to 2.5 in broad,  
 midrib stout, very prominent beneath, impressed above, main nerves  
 8 pairs, curving upwards and joining in a looped intramarginal nerve,  
 unimpressed above, secondary nerves few and with the reticulations  
 irregular, petiole 3 to 5 in long, stout, densely ferruginous  
 pubescent *Inflorescence* of stout densely ferruginous pubescent  
 racemes, 1 to 1.5 in. long, bearing about 8 to 10 flowers, in the  
 axils of the upper leaves, bract 1, ovate, acute, 2 in long, brac-  
 teoles 2, similar but smaller, pedicels stout, 1 to 1.5 in long *Calyx*  
*tube* campanulate, densely rusty pubescent, teeth 5, rounded, .05 in  
 long *Corolla-tube* narrow funnel shaped, 1 to 1.5 in long, densely  
 white-tomentose without, lobes 5 in long, oblong, reflexed *Staminal*  
*tube* adnate to the corolla tube as far as the lobes, then free above it,  
 top of tube truncate, 15-20-lobed, the lobes separable as ligules,  
 stamens inserted irregularly on the tube and lobes, about 40 to 60,  
 free part of filaments short, slender, anthers ovoid *Ovary* and disk  
 hairy, style slender, as long as corolla tube, stigma capitate, cells 3  
*Fruit* obovoid, obtuse, glabrous, 1.75 in long, 1.25 in broad, crowned

with the remains of the calyx-rim .125 in. wide, pericarp very thick, woody. Brand Monog Sympl. 90.

PERAK: *King's Collector* 6728. MALACCA: *Maingay* (K.D.) 961.

25. SYMPLOCOS SCORTECHINII, King & Gamble, n. sp. A tree (?); branchlets pale brown, slender, scurfy; innovations sparsely grey-pubescent. *Leaves* chartaceous, oblong-lanceolate, attenuately blunt-acuminate at apex, cuneate at base, glabrous on both surfaces dark brown when dry, margins entire; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath, impressed above; main-nerves 8 to 10 pairs the lowest close to the margin, the others curved upwards to meet in a looped intramarginal nerve, secondary nerves many and, with the reticulations, irregular, fairly prominent; petiole .5 in. long, channelled above, slightly pubescent when young. *Inflorescence* of axillary or pseudo-terminal racemes, 7 to 1 in. long, sometimes giving the appearance of a terminal panicle, rachis grey-pubescent, angular, bract and 2 bracteoles lanceolate-acuminate, .1 to 1.5 in. long; pedicels .2 in. long. *Calyx-tube* campanulate, 2 in. long, grey-pubescent without, as are the rounded obtuse .05 in. long teeth. *Corolla-tube* slender, funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without, lobes .5 in. long, oblong-obtuse, much imbricate in bud. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it, top of tube truncate, about 15-lobed, the lobes separable as ligules, stamens inserted irregularly on the tube and lobes, about 40 to 50, free part of filaments short, slender; anthers rounded. *Ovary* and disk hairy, style slender, as long as corolla-tube, stigma capitate, cells 3, ovules 2 in each cell. *Fruit* obovoid-oblong, obtuse, glabrous, 1.75 in. long, 1.2 in. broad, crowned with the remains of the calyx-rim .1 in. in diam, pericarp thick, corky, seed 1.

PERAK *Scortechini*.

This species comes very near to *S. Maingayi* in respect to its flowers and fruit, but the branches are much more slender, the dense ferruginous tomentum is absent, and the leaves are different, so we have no hesitation in describing it as a new species.

The following Bornean species seems worthy of description here: it may possibly be found also in the Peninsula.—

SYMPLOCOS HAVILANDI, King & Gamble, n. sp. A small tree (?); branchlets stout, somewhat flattened, yellowish brown, leaf-buds conical, glabrous. *Leaves* coriaceous, elliptic, abruptly acuminate at apex, acute at base, glabrous on both surfaces, orange-brown when dry, margins entire, recurved, 3 to 4 in. long, 1.25 to 1.75 in. broad, midrib stout, impressed above, main-nerves 7 to 8 pairs, the lowest pair near the margin and more acutely angled (about 45°) than the others, straight at first at an angle of 60°, then curved to meet in a widely looped intramarginal nerve, prominently raised above when dry, secondary-nerves and reticulations also raised; petiole .4 to .5 in. long, stout, rough, the upper half winged by the decurrent margin of the blade. *Inflorescence* a nearly sessile, few-branched panicle of racemes, about 1.5 in. long;

flowers about 12; rachis glabrous, flattened; bracts and bracteoles minute, caducous; pedicels none or very short, scarcely .05 in. long; buds globose. *Calyx-tube* .05 in. long; lobes orbicular, ciliate, as long as tube. *Corolla-tube* very short, lobes 5, .15 in. long, ovate-oblong, ciliate. *Stamens* about 50, in 5 bundles of about 10 each, opposite the corolla-lobes; anther-cells orbicular; filaments slender, the longest as long as the petals. *Ovary* conical, glabrous; style slender, .1 in. long, stigma capitate. *Fruit* not known.

BORNEO. in Sarawak, near Kuching, *Haviland* No. 1954

## 2. STYRAX, Linn.

Trees and shrubs, usually more or less lepidote or stellate-tomentose on all parts **except** the upper-surface of the leaves, rarely glabrous. *Leaves* various in shape, entire or serrulate. *Flowers* generally white, in lax axillary or terminal, simple or compound, often pendulous racemes, bracts very small. *Calyx* campanulate, free or slightly adnate to the base of the ovary, truncate or 5-toothed. *Corolla-tube* short, lobes 5, erecto-patent, elliptic-oblong, imbricate or valvate. *Stamens* 10, 1-seriate at the base of the corolla-tube, filaments more or less flattened, continuous with the connective, anthers large, linear, the cells parallel, erect. *Ovary* nearly free, at first 3-celled, later often 1-celled, style subulate, stigma capitate, somewhat 3-lobed; ovules few in each cell, in free ovaries nearly all erect from the lower basal angle, in half-adnate ovaries upper pendulous lower erect. *Fruit* globose or ellipsoid, seated on the cupuliform or patelliform calyx, breaking up irregularly. *Seeds* 1 or rarely 2 or more, integuments 2, the outer chartaceous or hardened, the inner membranous, albumen fleshy, copious, embryo straight, axile or excentric; cotyledons broad, with a longish terete radicle — **DISTRIB.** Warmer regions of Asia and America, a few extending to temperate Asia and South Europe, species about 60.

Leaves green beneath, slightly stellate-pubescent .. .. 1 *S. serrulatum*  
Leaves white or greyish-white beneath, with occasional rusty-stellate hairs —

Leaves small, under 5 in long and 2.5 in broad, calyx about one-third of the length of the corolla .. .. 2 *S. Benzoin*

Leaves large, over 5 in long and 2.5 in. broad; calyx about half of the length of the corolla . . . . . 3 *S. crotonoides*

1. *STYRAX SERRULATUM*, Roxb. Fl. Ind II. 415 (1832). A shrub or small tree, reaching 50 feet in height; branches slender, branchlets stellately grey-pubescent. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or cordate, sometimes acute at base, nearly glabrous above, glabrescent beneath, but with stellate hairs on both sides of the nerves, margins sparingly and irregularly serrate, sometimes sub-

entire, slightly revolute, 1.5 to 5 in long, 1 to 2 in broad, midrib slender, main nerves 6 to 8 pairs, curving upwards and anastomosing near the margin, secondary nerves and reticulations prominent, the latter transverse, petiole 2 in long, stellate pubescent. *Racemes* terminal or from the axils of the uppermost leaves of the branchlets, 6-8 flowered or fewer, sometimes reduced to 1 only, sometimes paniculate from the absence of leaves, 1 to 2 in long, rachis slender, densely white stellate-pubescent, pedicels 2 in long, bracteoles linear, nearly as long as pedicels, flowers white. *Calyx* campanulate, tube white-pubescent without, glabrous within, 15 in long, teeth 5, 0.5 in long, irregular, repand-dentate, white-pubescent on both sides. *Corolla-tube* 15 in long, cylindric, lobes 5, 2.5 in long, oblong, sub-acute, densely white pubescent without and within except the lower part of the tube. *Stamens* 10-25 in long, filaments inserted on the corolla-tube, wide and white tomentose at the base, narrower and glabrous above, continued in the connective, anthers broadly linear, erect, as long as the filaments, rounded at top, cells 2 parallel. *Ovary* densely white villous, style slender, 3 in long, stigma small, capitate, cells 3. *Fruit* ellipsoid, 4 to 5 in long, 3 in broad, white- or grey pubescent, supported by the patelloid calyx, pericarp fleshy, rather thin, irregularly breaking up. *Seeds* 1, rarely 2 or more, outer integument smooth, hard, shining, brittle, inner one membranous, brown, albumen firm, grey, embryo erect, nearly as long as the endosperm, cotyledons cordate, 15 in long, radicle thick, terete, as long as cotyledons. Wall Cat 4402. A DC Prod VIII 267, Hook f in Bot Mag t 5950 (*syn. rel.*), Kuiz in Journ As Soc Beng XLVI n 237 and For Fl II 142, Clarke in Hook f Fl Br Ind III 588, Prain Beng Plants I 656. *S. Portuensis*, Wall Cat 4401, A DC l c, Miq Fl Ind Bat I Pt 2, 163. *S. floribunda*, Griff Notul IV 287.

PI NANG Wallich 4401 Phillips, Curtis 1187, 1538 Ridley 7176 PERAK King's Collector 1662. *DISTRIB* India, at 3000 to 7,000 feet from Nepal to Assam, Chittagong and Burma.

The plant is frequently affected by galls

2. *STYRAX BENZOIN*, Diyand in Phil Trans Vol LXXVII 303, t 12 (1787). A tree with slender drooping branches, reaching 60 to 80 feet in height and 2 to 3 feet in diam of stem, branches rounded, glabrous, upper branchlets rusty grey stellate-pubescent. *Leaves* chartaceous, elliptic, acuminate at apex, attenuate or rounded at base, glabrous above, densely grey-stellate-pubescent beneath, margins entire or rarely slightly denticulate, 4 to 5 in long, 1.5 to 2.5 in broad, midrib slender, prominent beneath, impressed above, main-nerves 6 to 8 pairs, curving

upwards to and along the margin, reticulations transverse, regular, prominent, petiole 3 to 5 in long, channelled above, densely grey-stellate-pubescent *Racemes* paniculate, terminal or axillary to the upper leaves, grey-stellate pubescent, bracts ovate, caducous, pedicels slender, angular, 1 to 2 in. long, bracteoles linear, as long as the pedicels or nearly so, flowers silvery-white *Calyx* cupular, 15 in long, densely grey-stellate-pubescent without, teeth 5, minute *Corolla tube* 15 in long, cylindric, lobes 5, 3 in long, oblong linear, acute, white pubescent without and more or less within, recurved *Stamens* 10, 3 in long, attached to the tube of the corolla, filaments flattened, 15 in long, white-pubescent, continued in the connective, anthers linear, slender, erect, acute at tip, as long as filaments, cells parallel *Ovary* conical, villous above, style slender, 3 in long, stigma small, capitate, cells 3, ovules 2 or more in each cell, placentas central *Fruit* depressed globose, variable in size, reaching 8 in in diam and 6 in in height, white-pubescent, supported by the flattened persistent patelliform calyx pericarp corky, rather thick, irregularly dehiscing *Seed* usually 1, pale-brown with a broad basal hilum, outer integument hard, brittle, inner membranous, albumen firm, embryo horizontal or oblique, nearly as long as the endosperm, cotyledons flattened, oblong cordate, 2 in long, radicle smooth, 15 in long, cylindric *Blume* Bijdr 671, Roxb Fl Ind II 416, A DC Prod VIII 260, Benth & Trim Med Pl III t 169, Miq Fl Ind Bat I Pt 2, 463, Clarke in Hook f Fl Br Ind III 589 Gurke in Engl & Prantl Pflanzenfam IV 1 178, fig 93, Koord & Val Bijdr VII 132

PERAK *Wray* 808, 1208, *Scortechium* 1998, *King's Collector* 4459, 7840, 7884, 8615, 10203, 10305 MALACCA *Maingay* (K D) 963 964, *Griffith* (K D) 3668 SINGAPORE *Ridley* 2650.—DISTRIB Sumatra (*Beccari* 699, *Forbes* 3120A), Java (*Forbes* 1183)

This species gives the gum 'Benzoin' or 'Benjamin,' of commerce The plant is often affected by galls, causing curious tassel like excrescences on the branches The tree has the odour of violets (*Wray*)

3 STYRAX CROTONOIDES, Clarke in Hook f Fl Br Ind III 589 (1882) A tree, 60 to 80 feet high and 15 to 20 in in diam of stem, branches spreading and drooping, branchlets rather thick, grey, ultimate ones and innovations densely clothed with whitish-grey and rusty-stellate tomentum, the rusty hairs large and scattered among the rest *Leaves* chartaceo-coriaceous, broadly oblong or elliptic-oblong, abruptly acuminate at apex, attenuate or cuneate at base, glabrous above except on the nerves, densely white-tomentose beneath, and with scattered rusty-stellate hairs, margins entire or undulate, 5 to 7 in. long, 2 5 to

4 in broad, midrib prominent beneath, impressed and stellate-pilose above, main-nerves about 10 pairs, prominent, arched upwards to and along the margin, reticulations prominent, transverse, petiole 3 to 4 in. long, stellate-pubescent. *Racemes* in terminal and axillary panicles, 4 to 8 in long, densely white-tomentose and rusty-stellate-pilose, including calyx, pedicels very short, 0 to 15 in long, bracts oblong-lanceolate, glandular-dentate, 25 in long, bractcoles 2, linear subulate, 15 in long, flowers creamy-white. *Calyx-tube* cupular, 2 to 25 in long, truncate, teeth 5, very minute. *Corolla-tube* short, 15 long, glabrous at the very base, appressed white pubescent above, lobes 5, valvate, 3 in long, linear oblong, acute, afterwards recurved. *Stamens* 10, about 3 in long, filaments short, flat, glabrous, continued in the connective which is white pubescent on the back, anthers 2 in long, linear, mucronate, cells parallel. *Ovary* 5-lobed, white villous, conical, style slender, as long as corolla, stigma capitate, cells 3, ovules 5 to 6, erect. *Fruit* ovoid, grey-pubescent, mucronate, 75 to 1 in in diam, supported by the cupuliform calyx, pericarp thick, corky. *Seed* 1, outer integument pale brown, smooth, crustaceous, with a broad basal hilum, inner integument membranous, albumen firm, endosperm cushion-like, embryo somewhat oblique, cotyledons cordate, 2 in long, radicle thick, terete, as long as cotyledons. *Croton affinis* sp Wall Cat 7348

PFRAK *Scortechini* 179, *King's Collector* 7775, 7967, 8558, 10734  
SINGAPORE *Wallich* 7848, *Cantley* 60

This species, like the others is also frequently found with large tassel like insect galls in place of the inflorescence

#### Order LXXIV OLEACEÆ

Erect or climbing shrubs or trees, unarmed. *Leaves* usually opposite, rarely alternate or verticillate, simple or pinnately 3-few foliolate, entire or toothed, stipules none. *Inflorescence* sometimes dichotomously cymose and centrifugal, sometimes trichotomously paniculate, some or all branches centripetal, cymes or panicles axillary or terminal. *Flowers* hermaphrodite, often dimorphous, sometimes polygamous or dioecious, regular. *Calyx* free, usually small, campanulate, 4- or more toothed or lobed, rarely 0. *Corolla* gamopetalous, tube long or short, lobes or petals 4 to 12, imbricate or induplicate-valvate in bud. *Stamens* usually 2, sometimes 4, inserted on the corolla, or hypogynous if the petals are free or 0, filaments usually short, anthers rather large, ovate or oblong, rarely linear, dehiscing on the margin. *Ovary* free, 2-celled, style short or long, stigma simple or 2-lobed, ovules 1 to 2, rarely more, in each cell, attached to the inner angle near

the apex or base *Fruit* capsular, loculicidally 2-valved or indehiscent, or a berry or drupe *Seeds* solitary or 2 in each cell, erect or pendulous, testa thin or bony, albumen fleshy or horny or 0, embryo straight, radicle inferior or superior — **DISTRIB** Tropical and temperate regions of the world, genera about 18, species about 280

**Corolla lobes imbricate** —

Seeds exalbuminous, usually climbing shrubs

1 JASMINUM

Seeds albuminous, small trees ..

2 OSMANTHUS

**Corolla lobes valvate** —

Radicle superior, trees or erect shrubs —

Corolla tube very short petals often in pairs

3 LINOCIERA

Corolla tubular sometimes absent

4 OLEA

Radicle inferior, climbing shrubs

5 MAAPYRUM

*Nyctanthes Arbor tristis* Linn, is found in gardens in cultivation

### 1 JASMINUM, Linn

Erect or climbing shrubs *Leaves* opposite or rarely alternate, simple trifoliate or imparipinnate, generally entire, petiole usually articulate *Flowers* often handsome, white pink or yellow, often sweet scented, in 2 or 3-chotomous or simple cymes or sometimes solitary, axillary or terminal, inflorescence centrifugal, bracts linear and small or ovate, sometimes petaloid, bracteoles usually linear *Calyx tube* usually funnel-shaped or campanulate, lobes 4 to 9, linear, long or short or 0 *Corolla tube* narrow, more or less elongate, lobes 4 to 9, spreading, much imbricate *Stamens* 2, usually included in the corolla-tube, filaments short, anthers oblong, attached to the filaments at the back near the base, cells parallel, connective broad, usually produced in a mucronate point *Ovary* 2 celled, ovules usually 2 in each cell, attached near the base, style filiform, long or short, often both in different flowers on the same plant, stigma oblong or capitate, generally bifid *Berry* didymous or simple by suppression of one carpel, carpels globose, ellipsoid or elongate, pericarp usually of two layers, the outer (exocarp) membranous, the inner (endocarp) fleshy or fibrous *Seeds* usually 1 in each carpel, sometimes 2, testa very thin, albumen none, cotyledons plano convex, radicle inferior, very small, included within the cotyledons or slightly exsert — **DISTRIB** Tropical and warm temperate regions of Asia, Africa, and Australia, one species in Europe many in cultivation about 90 species in all

**Leaves simple** —

Leaves penninerved, basal pair of nerves not opposite nor produced to form an intramarginal nerve —

Inflorescence terminal —

Erect or straggling shrub

1 *J. Sambac*



## Climbing shrubs :—

- Calyx lobes .2 in long or longer ; leaves rather large —  
 Leaves chartaceous .—  
   Leaves and branchlets fulvous-pilose, main-nerves  
   10 to 12 pairs . . . . . 2. *J. Griffithii*.  
   Leaves and branchlets glabrous, main-nerves 6 to  
   8 pairs . . . . . 3. *J. Mangayi*.  
 Leaves membranous —  
   Calyx-lobes spreading, .25 in. long or longer ; fruit-  
   ing pedicels thickened . . . . . 4. *J. Wrayi*.  
   Calyx-lobes erect, 5 in. long, pedicels very short . . . . . 5. *J. Curtissii*.  
 Calyx-lobes under .2 in long, pubescent ; leaves  
 small :—  
   Corolla-tube short, .25 in. long . . . . . 6. *J. decussatum*.  
   Corolla-tube .6 to .8 in long. . . . . 7. *J. bifarium*.  
 Inflorescence axillary . . . . . 8. *J. adenophyllum*.  
 Leaves penninerved, basal pair of nerves opposite, produced to  
 form an intramarginal nerve —  
 Basal pair of nerves prominent, branchlets round .—  
   Flowers in few-flowered long-peduncled cymes ; pedicels  
   1 to 1.5 in long . . . . . 9. *J. longipetalum*.  
   Flowers in many-flowered short-peduncled cymes ; pedi-  
   cels under .5 in. long . . . . . 10. *J. smilacifolium*  
   Basal pair of nerves not prominent, branchlets 4-angulate . . . . . 11. *J. insigne*.  
 Leaves 3-foliolate . . . . . 12. *J. Scottichnum*

1. *JASMINUM SAMBAC*, Ait Hort. Kew. I 8 (1789) A sub-erect, straggling, scarcely climbing shrub, branches terete, smooth, branchlets slender, pubescent. *Leaves* membranous, variable, usually ovate, often broadly so, acute or obtuse at apex, cuneate or rounded or cordate at base, glabrous above, pubescent on the nerves beneath, often with tufts of hair in the axils of the main-nerves, margins recurved ; 1.5 to 4.5 in. long, 1 to 2.5 in. broad, midrib slender, impressed above, raised beneath ; main-nerves 4 to 6 pairs, arching upwards to and along the margin, raised beneath, reticulations distinct on both sides ; petiole .1 to .25 in. long, pubescent, articulate in the middle. *Flowers* white, very fragrant, solitary or in 2-3-flowered terminal pubescent cymes ; bracteoles linear-subulate ; pedicels .25 in. long, pubescent. *Calyx*-tube campanulate, .1 in. long, teeth 5 to 9, linear-subulate, .1 to .25 in. long. *Corolla*-tube slender, funnel-shaped, 5 in. long, lobes 8 to 9, spreading, as long as tube, oblong acute or obtuse. *Stamens* included in the tube, filaments short, anthers oblong. *Ovary* rounded, style slender, stigmas 2, clavate. *Berry* didymous or with 1 carpel only by suppression, carpels black, 25 in in diam, sub-globose, surrounded by the sub-erect persistent calyx-teeth. Bot. Reg. t. 1 ; Bot. Mag. t. 1785 ; Wall. Cat. 2868 ; A.D.C. Prod. VIII 301 ; Wight Ic. t. 704 ; Dalz. & Gibs. Bomb. Fl 137 ; Brandis For. Fl 311, Kurz in Journ. As. Soc.

Beng. XLVI. ii. 242, and For. Fl. II. 153; Clarke in Hook. f. Fl. Br. Ind. III. 591, Blume Bijdr. 677; Miq. Fl. Ind. Bat. II. 542; Cooke Bomb. Fl. II. 111; Prain Beng. Plants 659. *J. fragrans*, Salisb. Prod. 12. *J. undulatum*, Willd. Sp. Pl. I. 36 (not of Ker). *J. Sambac*, Roxb. Hort. Beng. 2, and Fl. Ind. Ed. Carey & Wall I. 87. *J. quinqueflorum*, Heyne; Wall. Cat. 2878; A.D.C. l c. 302. *J. pubescens*, Wall. Cat. 2880, not of Willd. *Nyctanthes Sambac* and *undulatum*, Linn. Sp. Pl. 8. *Mogorium Sambac*, Lamk. Dict. IV. 210; Ill. t. 6, fig. 1. *M. undulatum*, Lamk. Dict. IV. 212. "Kudda-mulla," Rheede Hort. Mal. VI tt. 50, 51. Burm. Thes. Zeyl. t. 58, fig. 2

PERAK: *Scortechini* 997.—DISTRIB. India, Ceylon, Burma, Siam.

Much cultivated in India and in all tropical regions. The cultivated forms have many-flowered cymes and rounded corolla-lobes, and they are often found with double flowers

2 *JASMINUM GRIFFITHII*, Clarke in Hook. f. Fl. Br. Ind. III. 593 (1882). A slender climbing shrub; branchlets densely and patently fulvous villous. Leaves chartaceous; ovate or elliptic-oblong, bluntly acute or acuminate at apex, rounded or cordate at base; fulvous-pilose on both surfaces, sparsely above, more densely beneath but glabrescent when old, the uppermost often whitened, 4 to 6 in. long, 1.5 to 3.5 in. broad, midrib prominent beneath, main-nerves 10 to 12 pairs, at first straight then arching upwards to join in a prominent looped intra-marginal nerve, secondary nerves few, reticulations rather indistinct; midrib and all nerves impressed above and pilose, raised and densely fulvous-villous beneath, tufted in the axils; petiole stout, .2 to .4 in. long. Flowers creamy-white, in terminal, many-flowered, fulvous-pilose cymes, 1 to 1.5 in. long and up to 2 in. broad; bracts leafy, lanceolate, about 5 to 1 in. long, few, bracteoles many, linear, similar to calyx-lobes, of various lengths. Calyx-tube slender, .1 in. long, lobes 5, linear, .2 in. long. Corolla-tube slender, slightly enlarged above, .75 in. long, lobes 5, spreading, .25 in. long, elliptic, apiculate, lobes and tube minutely pubescent without. Stamens included or slightly exsert, filaments broad; anthers oblong-lanceolate with a broad connective, .15 to .2 in. long. Ovary glabrous; style slender; stigma clavate. Berry didymous, carpels waxy-white, globose, .3 to .4 in. in diam., pericarp crustaceous, glabrous. Seed usually one, testa fibrous, cotyledons thick, plano-convex, .2 in. in diam.

PERAK: *King's Collector* 10229. MALACCA: *Griffith* (K.D.) 3704. SINGAPORE: *Ridley* 8455.

VAR. *cuspidata*, King & Gamble. Leaves thinner than in the type, oblong, abruptly and sharply cuspidate-acuminate at apex, attenuate and

abruptly rounded at base, 5 to 5.5 in long, 1.5 to 2 in broad, much less pilose, main nerves 8 to 10 pairs, seeds 1 to 2, testa crustaceous

PENANG *Curtis* 2787 MALACCA *Maingay* (K D) 998 JOHORE at Gunong Palai, 1,400 feet, *G. King*

3 JASMINUM MAINGAYI, Clarke in Hook f Fl Br Ind III 594 (1882)

A climbing shrub, branchlets light brown, terete, internodes somewhat elongate, innovations and inflorescence tawny pubescent. *Leaves* chartaceous, ovate or ovate oblong, acuminate and often mucronate at apex, rounded or attenuate or cuneate at base, glabrous on both surfaces, margins recurved, 3 to 6 in long, 2 to 2.5 in broad, midrib stout, main nerves 6 to 8 pairs, arching upwards to join in a looped intramarginal nerve about 2 in from the margin, secondary nerves few, reticulations distant, obscure all nerves strongly impressed above and raised beneath, petiole 5 to 7 in long, articulate in the middle, twisted, the bases of each pair connected by a raised nodal line. *Flowers* in terminal or axillary, paniculate, tawny pubescent, trichotomous cymes, 1.5 to 2 in long sessile or peduncled bracts oblong or spatulate, leafy, bracteoles linear, about 2.5 in long or less pedicels blueish, 1.5 in long, flowers white, sometimes slightly tinged with pink. *Calyx* tube campanulate, .07 to 1 in long teeth 6, linear subulate .325 in long. *Corolla* tube slender, 5 to 7 in long, glabrous, lobes 8 to 10, spreading rotate, oblong lanceolate, apiculate, 4 in long, with prominent nerves. *Stamens* included in the corolla tube filaments slender, appressed to the tube, anthers oblong, mucronate 1.5 in long connective broad. *Ovary* cylindrical glabrous style slender, 4 to 5 in long stigma clavate. *Fruit* of one carpel oblong, 5 in long, 3 in broad, exocarp thin shining, endocarp fibrous. *Seeds* 2, testa thin. Hook f Bot Mag t 7823

PENANG *Maingay* (K D) 1000 *Curtis* 643 PERAK *Scortechini* 139, 304 *Curtis* 2032, *King's Collector* 2761, 2762, 3975 —DISTRIB Borneo (*Haviland & Hose* 911)

VAR *kedahensis*, King & Gamble. *Branchlets* and inflorescence thickly rusty pubescent. *Leaves* more ovate rounded at base, nerves fewer, rarely 3 to 4 pairs, the two lower pairs very strong. *Drupe* nearly globose

KEDAH *Ridley* 5535

A well marked variety which may prove when better known, to be a species

4 JASMINUM WRAYI King & Gamble, n sp. A slender climbing shrub, branchlets pale brown slender, terete. *Leaves* membranous, oblong or obovate oblong, acuminate at apex, attenuate or rounded, sometimes slightly auricled at base, glabrous on both surfaces except

for tufts of tawny hairs in the axils of the main nerves beneath, 3 to 7 in long, 1.5 to 2.5 in broad, midrib very slender, raised beneath, main nerves about 7 pairs, curving upwards to and along the margin where they are obscurely connected in an intramarginal looped nerve, usually slightly impressed above and raised beneath, secondary nerves and reticulations obscure, petiole 3 to 5 in, slender, twisted. *Flowers* cream coloured, in terminal, about 15–20 flowered corymbose cymes 2 to 3 in long, peduncle 1 to 1.5 in long, branches at right angles to rachis in fruit, 7 to 1 in long, bracts lanceolate acuminate, 5 in long, bracteoles linear subulate, 2 to 3 in long pedicels slender in flower, clavately thickened in fruit and then 3 to 5 in long. *Calyx tube* very short, lobes 5, linear subulate, spreading, curved, .25 in long, glabrous or slightly pilose. *Corolla tube* slender, .75 in long, slightly enlarged above, lobes 8 to 9, narrow, 3 to 4 in long. *Stamens* included in the corolla tube, filaments short, anthers oblong, long mucronate. *Ovary* cylindric, depressed, style slender, stigma slightly clavate. *Fruit* didymous, carpels ovoid globose, greenish white, .25 to .5 in long, exocarp thin shining, endocarp fibrous. *Seed* 1 testa very thin, membranous, cotyledons plano convex, thick.

PERAK Wray 2297, 2905, 3147. *King's Collector* 1838, 2484.

VAR *hispida*, King & Gamble. Upper branchlets and inflorescence including calyx sparsely hispid, also midrib and main nerves of leaves beneath and under surface of leaves often pubescent, main nerves up to 10 pairs.

PERAK *King's Collector* 5893, on limestone hills. SINGAPORE *Curtis* 3774.

VAR *axillaris*, King & Gamble. *Leaves* rather small, sparsely pubescent, especially on the midrib and main nerves. *Inflorescence* axillary, few flowered (5 to 7), calyx hispid, fruit large, up to .5 in diam.

PERAK on Maxwell's Hill, 3,000 feet—a slender climber, *Scorte chim* 273.

5 JASMINUM CURTISII, King & Gamble, n. sp. A climbing shrub (?), branchlets slender, terete, minutely rusty pubescent. *Leaves* membranous, ovate or ovate oblong, acuminate at apex, rounded at base, glabrous on both surfaces except for pubescence on the nerves above and tufts of hair in the axils of the main nerves beneath, 3 to 5 in long, 1 to 2 in broad, midrib slender, main nerves 5 to 6 pairs, distant, curving upwards and joining in a looped nerve 1 to 2 in from the margin, raised and prominent on both surfaces, secondary nerves and reticulations few, irregular, petiole .4 in long pubescent, twisted, articulate in the middle, the bases of each pair connected by a faint

nodal line. *Flowers* in a terminal trichotomous rusty-pubescent cyme, supported by pale (white ?) leafy, ovate lanceolate, pubescent bracts 1 to 1.25 in long, bracteoles similar but smaller, pedicels 15 in long, flowers in each cyme about 15 to 20. *Calyx-tube* campanulate, .15 in long, lobes 6, linear-subulate, 5 in long. *Corolla-tube* slender, cylindrical, 1 in long, lobes 8 to 9, spreading or recurved, 5 in long, oblong-lanceolate, acute. *Anthers* oblong, 1.25 in long, mucronate. *Ovary* cylindric, glabrous, style slender, stigmas 2, clavate. *Fruit* not known.

PERAK at Ipoh, *Curtis*

A remarkable species, distinguished by the very long hair like calyx-lobes and the coloured or white large leafy bracts and bracteoles

6 *JASMINUM DECUSSATUM*, Wall Cat 2860 (1829) A climbing shrub, branchlets slender, densely rusty pubescent. *Leaves* chartaceous, ovate or ovate lanceolate, acuminate at apex, rounded at base, sparsely pubescent above, more densely so beneath, 2 to 4 in long, 1 to 1.5 in broad, midrib rather stout, main-nerves 4 to 5, lowest pair obscure, rest curved upwards to meet near the margin, impressed above, raised beneath, petiole 3 to 4 in long, pubescent, articulate near the base, the bases of each pair of petioles (as also branchlets) joined by a raised nodal line on either side. *Flowers* in densely pubescent axillary and terminal trichotomous corymbose cymes about 1 to 2 in long, supported by a pair of large leaf like bracts, bracteoles linear subulate, pedicels 1 to 2 in long. *Calyx-tube* short, teeth 6, subulate, 1 in long. *Corolla-tube* slender, .25 in long, lobes 8 to 9, as long as tube, oblong lanceolate, apiculate. *Stamens* included in the corolla-tube, filaments short, anthers oblong, 1 in long, mucronate. *Ovary* rounded, glabrous, style slender, longer than the corolla tube (in short stamened flowers), stigmas two, clavate. *Fruit* of one ellipsoid carpel, 2 to 3 in long, glabrous. A DC Prod VIII 306, Kurz in Journ As Soc XLVI 11 241, and For Fl II 151, Clarke in Hook f Fl Br Ind III 596

PENANG *King's Collector* 1425, at Trang, 100 to 300 feet — DISTRIBUTION Burma (*Wallich* 2860, *Giffith* 3699)

7 *JASMINUM BIFARIUM*, Wall Cat 2866 (1829) A climbing shrub, branchlets slender, terete, brown when dry, pubescent or nearly glabrous. *Leaves* chartaceous, usually bifarious, ovate or ovate oblong, acuminate at apex, rounded or truncate sometimes almost cordate at base, pubescent or sometimes nearly glabrous on both surfaces, 2 to 3 in long, 1 to 1.5 in broad, midrib slender, pubescent, impressed above, raised beneath, main nerves 4 to 6 pairs, pubescent, prominent beneath, arched upwards to join in an intramarginal nerve, secondary nerves and reticulations very obscure, petiole 2 to 3 in long, twisted, articu-

late in the middle, the bases of each pair connected (as are the branchlets) on either side by a raised nodal line. *Flowers* white, in few- (4-12) flowered, pubescent, sub-capitate cymes, sub-sessile in the axils of the two uppermost bract-like leaves, bracteoles linear subulate, 15 in long, pedicels 1 in long. *Calyx-tube* campanulate, teeth 5 to 7, linear-subulate, 1 to 15 in long. *Corolla-tube* slender, cylindric, 6 to 8 in long, lobes 6 to 9, ovate oblong, spreading, apiculate, 2 to 3 in long. *Stamens* included in the corolla-tube, filaments short, slender, anthers oblong, mucronate, 1 to 15 in long, connective broad. *Ovary* cylindric, glabrous, style slender, exsert, stigmas 2, clavate. *Fruit* a didymous berry, carpels ovoid, 5 in long, 2 in broad, exocarp membranous, shining, endocarp fibrous. *Seed* conform to carpel, testa very thin, membranous. A DC Prod VIII 305, Clarke in Hook f Fl Br Ind III 595. *J. bracteatum*, Wall Cat 2867. *J. nummularoides*, Blume Mus. Lugd Bat I 275, Miq Fl Ind Bat II 537.

PENANG Wallich 2866, 2867, Curtis 1920, Ridley 9361. PERAK Wray 4180, King's Collector 860, 4920, 10699, Deschamps, Scortechini 59, 144, 238. SELANGOR Ridley 7550, 8567. PAHANG Ridley in Trans Linn Soc, Ser 2, III 319.—DISTRIB Java.

VAR *glabra*, Clarke in Hook f Fl Br Ind III 595. *Leaves* larger, elliptic, rhomboid or rounded at the base, more glabrous, less bifarious, calyx teeth rather longer. *J. Lessertianum*, A DC Prod VIII 304.

JUNKBLYLON (Tongka) Curtis 2911. PENANG Mangay (K D) 999, Deschamps. PERAK Wray 4180, Scortechini, Kunstler 122. MALACCA Griffiths (K D) 3708, Goodenough 1995. JOHORE Ridley 4217. SINGAPORE Lobb, Ridley 10760.—DISTRIB Sumatra.

8 JASMINUM ADLNOPHYLLUM, Wall Cat 2876 (1829). A very slender wiry climber, branchlets extensively twining, glabrous. *Leaves* membranous, ovate lanceolate to elliptic oblong, variable, acuminate and mucronate at apex, cuneate at base, glabrous above except on the midrib, glabrous beneath except the tuft of tawny hairs in the axils of the main-nerves, margins somewhat undulate, 1.5 to 5 in long, .75 to 1.5 in broad, midrib slender, main nerves very slender, obscure, about 6 pairs, curving upwards to meet in a faint intramarginal looped nerve, petiole slender, twisted, articulate in the middle, 2 to 3 in long, hispid. *Flowers* white, solitary, or 2 to 3 together in a slender, sometimes leafy, umbel from the axils of the leaves, peduncle .75 to 1.25 in long, flattened above and with a pair of opposite bracts near the middle, bracts of umbel 2, linear-subulate, 3 in long, pedicels very slender, .75 to 1 in long, clavately enlarged in fruit. *Calyx-tube* campanulate, glabrous, ribbed, 1 in long, lobes linear-subulate, keeled on the back,

sparsely hispid, 4 to 5 in long, points recurved *Corolla-tube* slender, funnel shaped, 75 in long, lobes as long or slightly longer, 8 to 9, recurved, oblong-ligulate, about 25 to 3 in broad *Stamens* included in the corolla-tube, filaments short, slender, anthers oblong, mucronate, 15 in long, connective broad *Ovary* cylindric, style slender; stigma clavate *Fruit* globose, shining, young carpels 25 in in diam. A DC Prod VIII 314, Clarke in Hook f Fl Br Ind III 597

PENANG *King's Collector* 1736 —DISTRIB Khasia Hills (*Wallach*)

This species is clearly quite a small climber, and while the Penang specimens have only small leaves those from the Khasia Hills show comparatively large ones, but this is not unnatural, and we believe the identification to be correct

9 *JASMINUM LONGIPTALUM*, King & Gamble, n sp A large climbing shrub, reaching 30 to 40 feet, branchlets slender, terete, pale brown *Leaves* chartaceous-coriaceous, 3-nerved, elliptic, acute or shortly acuminate at apex, attenuate or cuneate or slightly rounded at base, glabrous on both surfaces, margins slightly recurved, 2 to 6 in long, 15 to 3 in broad, midrib slightly impressed above, shortly raised beneath, main-nerves 7 to 8 pairs, the basal pair opposite, at about 25° with the midrib produced in an intramarginal nerve about 25 in from the margin, looped where the others, which are at about 65° with the midrib, join it, secondary nerves and reticulations very indistinct, petiole 2 to 4 in long, twisted *Flowers* white tinged with pink, fascicled 3 to 6 together in the axils of the upper leaves, forming sessile umbellate cymes *Bracts* very small, ovate-acute, deciduous, pedicels 1 to 15 in long very slender, summit enlarged in fruit *Calyx tube* short, lobes 6, glabrous, linear-subulate, 1 in long, margins inflexed *Corolla-tube* very slender 75 in long, lobes 9, linear-oblong, acute, 3-5 nerved, 75 to 1 in long, much recurved in flower *Stamens* within the tube, filaments short slender, anthers oblong, 175 in long, obtuse *Ovary* glabrous 2-celled, style slender, stigma flattened, minutely pubescent *Fruit* didymous, carpel usually 1 only by suppression, black, globose, 4 to 5 in in diam, pericarp fleshy, glabrous *Seeds* 2, testa very thin, cotyledons plano-convex

PERAK *King's Collector* 2765, 6005—on rich soil at 300 to 800 feet elevation, scarce SINGAPORE *Ridley* 10937

A particularly handsome and well defined species, which is well worthy of garden cultivation

10 *JASMINUM SMILACIFOLIUM*, Griff MS, Clarke in Hook f Fl Br Ind III 600 (1882) A large glabrous climbing shrub, branchlets pale brown, terete *Leaves* coriaceous, 3 nerved, ovate, abruptly caudate-

acuminate at apex, obtuse or nearly cordate at base; margins entire, recurved; 5 to 7 in. long, 3 to 4 in. broad; midrib very prominent, impressed above, much raised beneath; two lowest main-nerves very prominent, similar to the midrib, curved upwards to form a pair of intramarginal nerves meeting at the apex; remaining main-nerves irregular, 3 to 4 pairs, inconspicuous; secondary nerves and reticulations raised above; petiole .75 in. long, twisted, articulate in the middle. *Inflorescence* of axillary 5-20-flowered cymes, rachis jointed, terete; bracts spatulate, .1 to .2 in. long; bracteoles smaller, linear, pedicels .2 to .3 in. long, greatly enlarged in fruit, flowers white, tinged with pink. *Calyx* campanulate, tube .15 in. long, teeth 5, .05 in. long. *Corolla-tube* slender, cylindrical, .75 to 1 in. long; lobes oblong, acute or apiculate, .75 in. long, .2 in. broad. *Stamens* inserted in the throat of the tube; filaments short; anthers linear-oblong, .25 in. long, mucronate. *Drupe* didymous; carpels ellipsoid, .1 in. long, .3 to .4 in. broad, smooth, shining.

MALACCA · Griffith (K.D.) 3698, *Maingay* (K.D.) 997.

11. *JASMINUM INSIGNE*, Blume Mus Bot. Lugd. Bat. I 278 (1849)  
An extensively climbing shrub, branches obscurely quadrangular with pale-grey corky bark, branchlets acutely quadrangular, glabrous, the edges pale-corky-winged. *Leaves* chartaceo-coriaceous, opposite, occasionally whorled, elliptic or elliptic-oblong, acute at apex, cuneate at base; glabrous on both surfaces; margins recurved; 2 to 8 in. long, 1 to 4 in. broad; midrib slender, raised beneath, main-nerves 6 to 7 pairs, the basal pair faint, opposite, at about 30° with the midrib, produced in an intramarginal nerve .1 to .2 in. from the margin, looped where the others, which are at 50° to the midrib, join it; secondary nerves and reticulations obscure, petiole .4 to 1.2 in. long, twisted, the upper part bordered for a short distance by the decurrent margins of the blade. *Flowers* white, in compact, many-flowered, glabrous cymes from the axils of the leaves or (more usually) from the stem, bracteoles subulate, .1 to .15 in. long, caducous, pedicels stout, .2 in. long, somewhat angular. *Calyx-tube* campanulate, .25 in. long; lobes 4 to 5, linear-subulate, unequal, .25 to .35 in. long, points hooked. *Corolla-tube* slender, .75 to 1 in. long, somewhat inflated above, mouth slightly thickened; lobes 4 to 5, spreading, ovate-oblong, apiculate, .5 in. long, .3 to .4 in. broad. *Stamens* in the tube of the corolla; filaments flattened; anthers oblong, mucronate, .25 to .3 in. long. *Ovary* glabrous, rounded; style slender, clavate, obscurely cleft in 2 short stigmas; cells 2. *Fruit* didymous; carpels oblong, smooth, white when ripe. Miq. Fl. Ind. Bat. II. 541. *J. cauliflorum*, Seortechini MS in Herb. Calcutta



PERAK : at Theripay Taipay, *Scortechini*; Wray 2840; Cantley 23; King's Collector 2890, 3398, 7059.—DISTRIB. Sumatra, Forbes 2906.

A very fine species of well-marked characters

12. *JASMINUM SCORTECHINII*, King & Gamble, n. sp. A slender climbing shrub, reaching 60 feet in length; branchlets dark-coloured, glabrous. *Leaves* thin when young, almost coriaceous when old, 3-sometimes 1-foliolate, opposite or sub-opposite; terminal leaflet ovate or lanceolate, acuminate at apex, rounded at base, glabrous on both surfaces, upper surface shining, nearly black when dry, lower surface dull, reddish when dry; 2.5 to 4 in long, 1 to 1.5 in. broad; lateral leaflets similar but slightly smaller and often lanceolate; midrib slender, raised beneath; main-nerves very indistinct, apparently 6 to 8 pairs; petiole .75 in long, petiolule of end leaflet .5, of side leaflets .3 in. long, all grooved, slender, articulate below the leaflet. *Flowers* white, in axillary or terminal trichotomous cymes, terminal ones often paniculate, peduncles .5 to 1 in. long; bracts ovate-acute or subulate, .1 in. long, cymes sparsely scaly, bracteoles at the base of the calyx minute; pedicels .1 to .2 in long, very much enlarged in fruit and then reaching .5 to .7 in. in length and .3 in in diam. at top. *Calyx-tube* campanulate, 125 in. long; teeth 5, very short, triangular. *Corolla-tube* slender, enlarged above, .4 to .6 in. long, lobes 5, ovate-cordate, obtuse, .3 to .4 in. long, spreading. *Stamens* included in the corolla-tube, filaments short; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindrical, glabrous, 2-celled; style slender, as long as the corolla-tube; stigma clavate. *Fruit* didymous; carpels ellipsoid, .75 to 1 in long, 5 in. broad; pericarp thin, crustaceous, blackish-brown. *Seed* nearly filling the cavity, testa thin, fragile, cotyledons oblong-obtuse, slightly auricled at base, .5 to .6 in. long by .25 in. broad, plano-convex.

PENANG. *Curtis* 1227, 2031 PERAK. *Scortechini* 383, 479; *Ridley* 10679; *King's Collector* 7006, 7009, *Curtis* 169.

The description is largely after *Scortechini* MS. The species comes very near *J. lanceolaria*, Roxb., but differs in its more slender habit, thinner leaves, and large ellipsoid carpels.

*Ridley's* No 8325 from Lankawi Island, Kedah, is a twiggy, apparently erect shrub with trifoliate leaves, the leaflets all obovate-orbicular emarginate, the end one reaching 1.7 in long and 1.3 in broad, the side ones only about .6 in long and broad. The fruits are of one carpel about the size of a small pea, and the flowers are unknown. It may possibly not be a *Jasminum* (Herb Kew).

The following species from Borneo is of interest, and may perhaps be found later on in the Peninsula —

*JASMINUM SARAWAKENSE*, King & Gamble, n. sp. A climbing shrub; branchlets pale brown, terete; internodes rather long. *Leaves* opposite, chartaceous; elliptic-

oblong, long acuminate at apex, cuneate at base, both surfaces glabrous, margins recurved, 4 to 7 in long, 175 to 275 in broad, midrib strong, impressed above, raised beneath, main nerves 4 pairs, the lowest pair near the margin at an angle of about 30° with the midrib, the remaining pairs at about 50° curving upwards to meet in an intramarginal looped nerve, which is also met by secondary nerves above the fourth pair, reticulations irregular, not prominent, petiole 5 to 75 in long, twisted in the middle *Inflorescence* of axillary, long peduncled trichotomous pubescent, corymbose cymes about 1 in broad at top usually 1 pair from each node, peduncle terete, 2 to 3 in long, sometimes branched minutely pubescent, branches very short 2 in long, pedicels clavate, 1 to 15 in long, bracts and bracteoles linear subulate 25 in long, one pair of bracteoles to each terminal fascicle of 3 flowers, flowers white, buds clavate, 1 in long *Calyx* tube campanulate, 15 in long, lobes 6, linear oblong, applicately infolded at the middle inwards, 15 to 2 in long pubescent *Corolla* tube cylindrical, 1 in long, lobes 6, spreading, oblong, rounded at top, 4 to 5 in long, prominently 3-5 nerved *Stamens* 2, inserted at about the middle of the tube within, filaments short, decurrent within the tube, anthers linear oblong 2 in long *Ovary* cylindric, truncate and depressed at top 2 celled, style very slender, stigma clavate *Fruit* not known

BORNEO near Kuching in Sarawak, *Haviland & Hose* 8489

## 2 OSMANTHUS, Lour

Trees or shrubs, glabrous *Leaves* opposite, evergreen, entire or dentate *Flowers* small, axillary or terminal, fascicled or in very short racemes, hermaphrodite or polygamous *Calyx* short, 4 toothed or lobed *Corolla* tube short or long, lobes 4, broad, obtuse, imbricate *Stamens* 2, more rarely 4, inserted on the corolla tube, anthers ovate, sub-extrorsely dehiscent *Ovary* 2 celled, ovules 2 in each cell, pendulous from its apex, style short or cylindric, 2 lobed or sub entire *Drupe* ovoid or globose, exocarp fleshy, endocarp bony or crustaceous *Seeds* usually solitary, pendulous testa thin, albumen fleshy cotyledons flat, radicle short, superior — *DISTRIB* NW Himalaya and eastwards to China and Japan, also in Western North America, about 8 to 10 species

OSMANTHUS SCORTECHINII, King & Gamble, n sp A tree, reaching 40 to 50 feet in height, and 10 to 15 in in diam of stem, branchlets terete with pale grey, somewhat corky, bark *Leaves* coriaceous, lanceolate, shortly acuminate at apex, cuneate at base, both surfaces glabrous, margins entire, recurved, 2 to 4 in long, 75 to 125 in broad, midrib thick, impressed above, raised beneath, main nerves very obscure, about 5 to 6 pairs, petiole broad, 3 to 6 in long, channelled above and bordered by the decurrent margins of the blade *Flowers* in very short, close, axillary racemes, reaching 5 in long in fruit, supported by a pair of ovate, acute, coriaceous bracts, pedicels slender, 05 in long *Calyx* membranous, 06 in long lobes 4, slightly serrate *Corolla* campanulate, tube 05 in long, lobes 1 in long, oblong, obtuse, margins incurved

*Stamens* 4, slightly exsert, inserted between the corolla-lobes at the top of the tube, filaments slender, anthers small, ovate, cells dehiscing on the margins or somewhat extrorsely. *Ovary* conical, glabrous, style slender, subulate, 0.4 in long, cells 2, ovules in each cell apparently 2. *Drupe* globose, 2 to 3 in diam, dark greenish-blue when ripe, exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa membranous, albumen fleshy, ruminant, cotyledons oblong, flat, narrow, radicle superior.

PERAK *Scortechium* 414—at Thaipeng, Wray 682, King's Collector 5029, 6978

The structure of the wood, so far as the examination of a very small branch goes, confirms the placing of this plant in the genus *Osmanthus*.

To this species seems also to belong King's Collector 3663, which has a bright red drupe reaching 5 in in length slightly ribbed and with a spatulate embryo having the radicle nearly as long as the cotyledons, each 1 in. It may be called VAR *oblonga*.

### 3 LINOCIERA, Swartz

Shrubs or trees. *Leaves* opposite, entire. *Flowers* small, in axillary or extra axillary, rarely terminal, panicles or cymes, bracts generally small, sometimes rather enlarged and leafy, bracteoles very small. *Calyx* small, 4 fid or toothed. *Corolla* of 4 petals, long or short, nearly free or cohering by pairs or very shortly connate, induplicate valvate in bud. *Stamens* 2, rarely 4, inserted at the base of the petals and usually between the two cohering ones, filaments short, anthers elliptic or oblong, dehiscing on the margin or slightly extrorse, connective broad, often apiculate. *Ovary* 2 celled, ovules 2 in each cell, pendulous from its apex. *Style* short, stigma bifid or entire. *Drupe* globose or ellipsoid. *Exocarp* fleshy, thin, *endocarp* bony or crustaceous. *Seed* usually solitary, pendulous, testa thin, albumen fleshy or 0, if fleshy the cotyledons flattened, radicle superior.—DISTRIB Tropics of both hemispheres, species about 40.

Leaves over 4 in long main nerves prominent beneath

Panicles 4 to 6 in long drupe .75 in long

Panicles 2 to 4 in long, drupe 1.7 in long

Panicles 1.5 to 2 in long drupe not known

Leaves under 4 in long main nerves obscure beneath cymes scarcely 1 in long

1 *L. pauciflora*

2 *L. macrocarpa*

3 *L. pulidosa*

4 *L. caudata*

1 LINOCIERA PAUCIFLORA, Clarke in Hook f Fl Br Ind III 609 (1882). A small tree, reaching 30 to 40 feet in height and 1.5 to 2 feet in diam of stem, branches moderately stout, pale grey, smooth, swollen at the nodes, internodes slightly angular, branchlets darker coloured,

slender; leaf-buds linear-lanceolate. *Leaves* coriaceous; elliptic-oblong, rounded or shortly obtusely acuminate at apex, cuneate at base; glabrous on both surfaces, but with prominent raised glandular papillæ, 4 to 9 in. long, 2 to 4 in. broad; midrib stout, slightly impressed above, prominently raised beneath, main-nerves 11 to 13 pairs, fairly prominent and regular, curving upwards to and along the margin near which they anastomose; secondary nerves and reticulations obscure, petiole .7 to 1.3 in. long, thickened at base. *Flowers* pale yellow or white, in compound axillary panicles, 4 to 6 in. long; main branches 1 to 2 in. long, rachis slender, glabrous, somewhat angular, bracts leafy, ovate or spatulate, .5 to 1 in. or sometimes longer, bracteoles ovate-acute, very small; pedicels slender, .05 to 1.5 in. long, much thickened and pale in fruit even when quite young. *Calyx-tube* short, teeth 4, ovate-acute, .05 in. long. *Corolla-lobes* in two pairs, oblong, 1 to .15 in. long, slightly hairy within. *Stamens* .05 in. long; filaments short, broad, anthers elliptic, emarginate, with a gland on the front of the connective. *Drupe* ellipsoid, .75 in. long, .3 to 4 in. broad, blueish-black when ripe; exocarp fleshy, endocarp thin, crustaceous. *Seed* 1, testa pergamaceous, albumen none, cotyledons fleshy, 55 in long; radiole very small, superior. *Olea* (?) *pauciflora*, Wall Cat 2812, A DC. Prod VIII. 288. *Chionanthus palembanica*, Miq. Fl. Ind. Bat. Suppl. 558, Kurz For. Fl. II 159, and Journ. As. Soc. Beng. XLVI ii. 243

KEDAH. *Curtis* PENANG *Wallich* 2812A, B, *G. King*, *Curtis* 695, 2773; *King's Collector* 1693, *Ridley* 10178. PERAK. *Ridley* 7160, *Scottechini* 952; *King's Collector* 4172, 4834 SINGAPORE *Ridley* 5079 —DISTRIB. Tenasserim, Andamans, Borneo (*Haviland* 1766).

2. *LINOCIERA MACROCARPA*, King & Gamble. A small tree; branchlets pale greyish-brown, stout, lenticellate, innovations ashy-pubescent. *Leaves* coriaceous, obovate-oblong or obovate lanceolate, obtuse or very shortly and bluntly acuminate at apex, long cuneate at base, glabrous on both surfaces; margins entire or slightly recurved; 6 to 10 in. long, 2 to 3.5 in. broad; midrib very stout, broad and plane above, much raised beneath, main-nerves 14 to 17 pairs, prominent beneath, curved only near the margin to meet in a faint looped intramarginal nerve, secondary nerves and reticulations obscure, petiole 1 to 1.5 in. long, enlarged at base. *Flowers* in ashy-pubescent panicles, 2 to 4 in. long; bracts leafy, sometimes oblong-lanceolate, more generally spatulate, bracteoles linear-subulate, short; pedicels variable, often 0; rachis and pedicels much enlarged in fruit. *Calyx* pubescent, tube short, lobes ovate-acute, .05 in. long. *Corolla-tube* very short, lobes oblong-linear, .1 to .15 in. long, margins much incurved. *Stamens* .075 in. long, anthers oblong, filaments very short,

connective produced in a conical acumen. *Ovary* pubescent; style short; stigma 2-lobed. *Drupe* oblong-ellipsoid, 1·7 in. long, 1 to 1·2 in. broad; exocarp thick, granular; endocarp hard, ·15 in. thick, obscurely ridged outside. *Seed* 1, testa membranous, albumen fleshy. *L. insignis*, Clarke in Hook. f. Fl. Br. Ind. III. 610. *Chionanthus macrocarpa*, Blume Mus. Bot. I. 319 (1849); Koord. & Val. Bijdr. VIII. 239. *C. insignis*, Miq. Fl. Ind. Bat. Suppl. 559 (1862). *C. montanus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 243, and For. Fl. II. 159.

SINGAPORE: at Bukit Mandai, *Ridley* 4580.—DISTRIB. Tenasserim (*Helfer* (K.D.) 3688), Martaban (*Kurz*), Sumatra (*Teysmann*, *Beccari* 826), Borneo (*Beccari* 725).

3. *LINOCIERA PALUDOSA*, King & Gamble, n. sp. A small tree (*Wray*), large tree, 60 to 80 feet high, and 15 to 20 in. in diam of stem (*King's Collector*); branchlets thick, pale greyish-brown. *Leaves* coriaceous; oblong, bluntly acute at apex, also at base; glabrous on both surfaces except on the nerves which are minutely pubescent; margins recurved; 6 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, slightly raised above, strongly so beneath main-nerves 11 to 15 pairs, impressed above, prominently raised beneath, ·75 to 1 in. apart, at first straight then curving upwards to and along the margin to anastomose and form a prominent looped intramarginal nerve; secondary nerves few; reticulations transverse, not prominent, petiole stout, wrinkled, ·5 in. long. *Flowers* yellow, with a brown centre, in pubescent panicles 1·5 to 2 in. long from the branchlets between the leaf-nodes in the axils of small tubercles; peduncles stout, grey-pubescent, ·2 in. long; bracts ovate, grey-pubescent, bracteoles ovate-acute, recurved; pedicels 0·5 in. long. *Calyx-tube* short, lobes ovate-acute or triangular, ciliate, ·025 in. long, one lobe sometimes enlarged. *Corolla-lobes* in 2 pairs, linear-oblong, obtuse, ·2 in. long, ·05 in. broad, glabrous. *Stamens* 0·5 in. long, filaments broad, short, anthers rounded, connective with an obscure gland. *Ovary* conical, glabrous; style short; stigmas 2. *Fruit* not known.

PERAK: at Sungie Larút, *Wray* 2424; on low wet ground, *King's Collector* 6476

4. *LINOCIERA CAUDATA*, King & Gamble, n. sp. A tree, reaching 30 to 40 feet in height and 5 to 7 in. in diam. of stem, branches slender, pale grey, ultimate branchlets darker. *Leaves* chartaceous, lanceolate, caudate-acuminate at apex, cuneate at base; glabrous on both surfaces, margins entire, recurved, 3 to 4 in. long, 1 to 1·25 in. broad, midrib slender, raised above, scarcely raised beneath; main-nerves very obscure, about 4 to 5 pairs, curving sharply upwards to meet in an intramarginal looped nerve; petiole ·1 to ·2 in. long, grooved above.

*Flowers* in axillary or extra-axillary, few-flowered, trichotomous, paniculate cymes about 1 in long, rachis glabrous, somewhat angular, bracts and bracteoles small, ovate, acute *Calyx* 0.5 in long, tube short, lobes 4, ovate, obtuse *Corolla-tube* scarcely any, lobes in 2 pairs, oblong, 1 in. long *Stamens* filaments broad, anthers oblong, cells extrorsely dehiscent, connective apiculate *Ovary* glabrous, conical, style very short, stigma bifid *Drupe* (immature) obovoid, 3 to 4 in long, seed apparently albuminous

PERAK *King's Collector* 3212, 6857, in dense jungle on high mountains at 3,500 to 4,000 feet

This species is rather near *L. monticola*, Bl., but the leaves are narrower and the inflorescence longer

#### 4. OLEA, Linn.

Trees or shrubs *Leaves* opposite, entire or toothed *Flowers* small, hermaphrodite, dioecious or polygamous, in axillary, rarely terminal trichotomous panicles, bracts small *Calyx* short, 4-toothed or lobed *Corolla tube* short, lobes 4, induplicate valvate, sometimes 0 *Stamens* 2, on the corolla tube or sub hypogynous, filaments short, anthers ovate or oblong, cells dehiscent on the margin or slightly extrorse, in ♂ flowers sometimes introse *Ovary* 2-celled, ovules 2 in each cell, attached laterally to the septum or sub pendulous, style short, stigma obtuse, capitate or bifid *Drupe* ellipsoid or sub globose, exocarp fleshy, endocarp bony or crustaceous, usually 1-seeded *Seed* pendulous, testa thin, albumen fleshy, sometimes slightly imbricate, cotyledons flat, radicle superior — *DISTRIB* South Europe and Asia, tropical and South Africa, New Zealand, about 35 species

Inflorescence more than 3 in long leaves oblong lanceolate acute, usually over 4 in in length

1 *O. dentata*

Inflorescence under 3 in long, leaves elliptic lanceolate acuminate under 4 in in length

2 *O. maritima*

#### SPECIES IMPERFECTLY KNOWN

Leaves 8 to 14 in long, inflorescence extra axillary on old wood, drupes flattened

3 *O. platycarpa*

Leaves 2 to 3 in long, inflorescence axillary or extra axillary on young wood, corolla lobes linear, 1 in long, drupes not known

4 *O. ardisioides*

1 *OLEA DENTATA*, Wall Cat 2840 (1829) A tree, 40 to 60 feet high, branchlets light brown, smooth, innovations minutely pubescent *Leaves* coriaceous, oblong lanceolate, bluntly acute at apex, cuneate or rounded at base, glabrous on both surfaces, but when young pubescent on the nerves beneath, margins entire or distantly dentate, slightly recurved, 3.5 to 5.5 in long, 1 to 2 in broad, midrib slender, im-

pressed above, raised beneath, main-nerves obscure, 8 to 10 pairs, arching upwards to join in a looped nerve near the margin, impressed above, petiole 4 in long. *Flowers* in axillary or extra-axillary, leafy, tripinnate, minutely pubescent, paniculate cymes, 3 to 6 in long, branches trichotomous, ultimate cymes umbellate, bracts leafy, oblong or lanceolate, 5 to 15 in long, pedicels slender, .05 to 1 in long, bracteoles minute, ovate acute. *Calyx* minutely pubescent, .05 in long, lobes 4, ovate, obtuse. *Corolla* tubular-campanulate, 15 in long, lobes 4, rounded, .05 in long. *Stamens* very small, inserted at the base of the corolla tube. filaments very short, anthers ovoid, subextrorsely dehiscent. *Ovary* ovoid, style none, stigma capitate, cells 2, ovules 2 in each cell. *Drupa* not seen. A DC Prodr VIII 286, Kurz in Journ As Soc Beng XLVI ii 245, and For Fl II 157, Clarke in Hook f Fl Br Ind III 613.

PENANG *Curtis* 222, 950, 2267 — *DISTRIB* Burma

2 *OLEA MARITIMA*, Wall Cat 2813 (1829). A large shrub or small tree. branchlets terete, pale brown. innovations minutely pubescent. *Leaves* coriaceous, elliptic lanceolate acuminate at apex cuneate or somewhat rounded at base glabrous on both surfaces, margins entire or distantly serrate on their upper half. 3 to 4 in long, 1 to 2 in broad midrib slender, impressed above raised beneath, main nerves obscure, 7 to 10 pairs, meeting near the margin in a looped intramarginal nerve, reticulations scanty, petiole 2 to 3 in long, minutely pubescent when young finally glabrous. *Flowers* dull white, polygamous, in slender, minutely pubescent, trichotomous paniculate cymes with few branches, ultimate cymes umbellate usually .75 to 1 in long in flower, up to 1.5 in long in fruit, rarely axillary, usually extra axillary. each pair of peduncles supported by a pair of ovate lanceolate leafy bracts 3 to 5 in long. common peduncles 7 in long. pedicels .05 to 1 in long, bracteoles none. *Calyx* .05 in long, minutely rusty pubescent, tube short lobes 4 ovate acute, as long as tube. *Corolla* campanulate, 1 to 1.5 in long lobes 4, obtuse, as long as tube, induplicate valvate, apparently absent in ♀. *Stamens* .07 in long, inserted near the base of the corolla tube. filaments slender, anthers as long as filaments, reniform cells subextrorsely dehiscent. *Ovary* conical, style none, stigma capitate cells 2, ovules in each cell pendulous. *Drupa* globose, 2 in in diam, black when ripe wrinkled when dry, exocarp thin, fleshy endocarp crustaceous. *Seed* 1, testa very thin, albumen copious cotyledons elliptic, nearly 1 in long, radicle somewhat thick. G. Don Gen Syst IV 49. A DC Prodr VIII 288, 288, Clarke in Hook f Fl Br Ind III 612, Miq Fl Ind Bat II 547.

MALACCA *Griffith* (K D) 3679, *Maugay* (K D) 1022, *Cuming* 2318; *Ridley* 3284, 10731 PAHANG a common bush on the sandy heaths, *Ridley* in Trans. Linn Soc Ser 2 III 319 SINGAPORE *Wallach* 2813, *Walker* 183, *Ridley* 3616A, 8420, *King's Collector* 1138, *Murton* 62—DISTRIB Malay Islands

## SPECIES IMPERFECTLY KNOWN

3 *OLEA PLATYCARPA*, King & Gamble, n sp A small tree with spreading branches, reaching 25 to 30 feet in height branchlets stout, pale brown, smooth, marked by the prominent horse shoe shaped scars of fallen leaves *Leaves* coriaceous, obovate-oblong or oblong-lanceolate, abruptly acuminate at apex, cuneate at base, glabrous on both surfaces and with scattered glands, margins entire, slightly recurved, 8 to 14 in long, 3 to 5 in broad, midrib very stout and prominent, main-nerves 14 to 16 pairs, curving upwards to join in a looped intramarginal nerve close to the margin, secondary nerves few, reticulations irregular, obscure, petiole 1 in long, base enlarged, wrinkled *Flowers* dioecious, in extra-axillary, sessile, paniculate, trichotomous cymes, usually on old wood, 1 to 15 in long, supported by a cluster of sheathing scarious bracts, bracts of panicle branches and bracteoles ovate acute pedicels very short, stout, somewhat angular *Calya* short, 0.5 in long, teeth (in ♀ flowers) ovate, obtuse, ciliate *Corolla* none in ♀, ♂ not seen *Ovary* conical, rugose, style 0, stigma 2 lobed, mitriform *Drupe* ovate-oblong, flattened, 7 in. long, 5 in broad, exocarp thick, wrinkled when dry, endocarp thick, granular, cells 2 *Seed* 1, pendulous from the summit of the thin central persistent septum, testa membranous, albumen thick, fleshy, cotyledons ovoid, 15 in long, radicle rather stout

PERAK at low levels on the hills, *King's Collector* 5541, 7649, *Hervey*

The absence of male flowers renders the identification of the genus of this plant somewhat uncertain, but we consider it belongs rightly to *Olea*

4 *OLEA ARDISIODES*, King & Gamble, n sp A small tree, branches slender, terete, with yellowish bark, branchlets minutely pubescent *Leaves* coriaceous, lanceolate, long acuminate at apex, cuneate at base, glabrous on both surfaces, margins entire, recurved, 2 to 3 in long, 6 to 1 in. broad, midrib slender, impressed above, raised beneath, main-nerves 5 pairs, curving upwards to meet in a looped intramarginal nerve, obscure, secondary nerves and reticulations very obscure, petiole slender, 1 to 2 in long *Flowers* in axillary or extra-axillary



slender paniculate cymes, 1 to 2 in. long; rachis somewhat angular, minutely pubescent; bracts leafy, lanceolate, .5 to 1 in. long; bracteoles similar or sometimes subulate-spathulate, pedicels slender, .1 in. long, reflexed. *Calyx-tube* very short; lobes 4, ovate-acute, .025 in. long, ciliate. *Corolla-tube* .03 to .05 in. long, lobes 4, induplicate-valvate, linear, .1 in. long. *Stamens* 2, inserted at the base of the corolla-tube, .05 in. long; filaments slender; anthers elliptic, cells dehiscent laterally, connective mucronate. *Ovary* conical, style 0, stigma minute, bifid; cells 2. *Fruit* not seen.

PERAK: on Gunong Bubu, 5,000 feet, Wray 3871. PAHANG. Barnes 10896

We have hesitated whether to describe this species as *Olea* or *Imociera*, for the corolla-tube is not very long, and the lobes are like those of the latter genus, but the character of the leaves is distinctly that of *Olea*

### 5 MYXOPYRUM, Blume.

Large scandent shrubs with quadrangular branches. *Leaves* opposite, large, triplinerved, entire or denticulate. *Flowers* small, yellow, very numerous, in axillary and terminal trichotomous panicles. *Calyx-tube* short, lobes 4. *Corolla* fleshy, tube urceolate, lobes 4, concave, induplicate-valvate in bud. *Stamens* 2, inserted on the base of the corolla-tube, filaments very short, anthers rather large, ovate, cells dehiscent laterally. *Ovary* 2-celled, style very short or 0, stigma 2-lobed, ovules 1 to 2 in each cell, attached near the base at the inner angle. *Fruit* a 1 2-seeded sub-globose berry, pericarp crustaceous. *Seeds* 1 to 4, erect, testa membranous, albumen thick, cotyledons flat, ovate, radicle inferior — *DISTRIB* India and Malaya, 3 species

*MYXOPYRUM NERVOSUM*, Blume Bijdr. 683 (1826). A large climbing shrub, branches with fibrous pale brown bark, branchlets prominently quadrangular. *Leaves* coriaceous, elliptic or elliptic-oblong or elliptic-lanceolate, acuminate at apex, cuneate or rounded at base, glabrous on both surfaces, margins entire or denticulate in the upper half, prominently recurved, 4 to 7 in. long, 1.5 to 3.5 in. broad; midrib thick, prominent beneath, impressed above; main-nerves 4 to 6 pairs, the lowest pair opposite, very prominent, starting a little above the base and forming an intramarginal nerve looped only after where it meets the rest at about two-thirds of the way up, the next pair not opposite and only starting from about half the length of the leaf; secondary nerves few, reticulations irregular, prominent in dry specimens; petiole .3 to .5 in. long, often twisted, channelled above, articulate at the base. *Flowers* sessile, in terminal or axillary or extra-axillary, trichotomous, minutely

pubescent panicles, 1·5 to 3 in. long, rachis angular, swollen at the nodes; bracts subulate, recurved, ·1 in. long; bracteoles triangular, minute. *Calyx-tube* very short; lobes 4, triangular, acuminate. *Corolla* yellowish- or greenish-white, fleshy, tube urceolate, ·05 to ·1 in. long; lobes oblong, incurved, ·05 in. long, induplicate-valvate in bud. *Stamens* 2, inserted on the tube of the corolla; filaments very short, broad; anthers ovate, rather large. *Ovary* ovoid; style 0; stigma 2-lobed; cells 2, ovules 2 in each cell, erect from a minute basal central placenta. *Berry* ovoid or globose, ·5 to ·7 in. in diam., rough, surmounted by the persistent stigma, blueish-black when ripe, cells 2. *Seeds* 2 to 4, erect on an enlarged placenta at the base of the central dissepiment; albumen fleshy, testa membranous. Mus. Bot. Lugd. Bat. I. 320, t. 51; A.DC. Prod. VIII. 290; Miq. Fl. Ind. Bat. II. 549; Clarke in Hook f. Fl. Br. Ind. III. 618.

PENANG: *Curtis* 2849. PERAK. *Wray* 2139, 2834, 4179; *Scortechini* 532, 598b; *King's Collector* 3584, 4544, 7392, 8845. MALACCA: *Maignay* (K.D.) 996/3—DISTRIB. Sumatra (*Forbes* 1585, in the Lampongs); Java.

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*Materials for a Flora of the Malayan Peninsula*—By SIR GEORGE KING, K C I E, LL D, F R S, late Superintendent of the Royal Botanic Garden, Calcutta, and J SYKES GAMBLE, C I E, F R S, late of the Indian Forest Department

No 18

This part contains nine Natural Orders, viz, Nos 79 *Hydrophyllaceæ* to 85 *Lentibulariaceæ* inclusive, as well as Nos 87 *Bignoniaceæ* and 88 *Pidalmeæ*. The whole part is the work of Lieut-Col D Prain, I M S, F R S, Superintendent of the Royal Botanic Garden, Calcutta, with the exception of *Boraginææ*, which has been done by Sir George King, and *Hydrophyllaceæ* and *Bignoniaceæ*, which have been done by Mr Gamble.

The nine Orders dealt with contain 53 genera and 150 species of the species none are here described for the first time.

Natural Order No 86 *Gesneraceæ* will follow later on with the three Orders, 75 *Apocynaceæ*, 76 *Asclepiadaceæ*, and 77 *Loganiaceæ*, the preparation of which is not yet quite complete.

### Order LXXIX HYDROPHYLLACEÆ

Annual or perennial herbaceous plants. *Leaves* radical or alternate, rarely opposite, entire or dentate, simple or pinnately or palmately lobed. *Flowers* usually unilaterally subsessile on the branches of a bifid or dichotomous scorpioid cyme, or else pedunculate in the axils or on the summits of the branches, regular, hermaphrodite. *Calyx*

inferior, with 5 or occasionally many equal imbricate lobes. *Corolla* gamopetalous, funnel-shaped cup-shaped campanulate or rotate; lobes 5, rarely many, imbricate or sometimes twisted. *Stamens* as many as the corolla-lobes, alternate with them, usually fixed to the base of the tube, exsert or included, filaments filiform, sometimes dilated or appendiculate at base, anthers ovate, oblong or linear, dorsifixed, cells 2, parallel, dehiscing introrsely with longitudinal clefts. *Ovary* superior, sometimes unilocular, with 2 free or parietal placentas, sometimes more or less completely 2 celled with fleshy placentas adnate to the septum, styles either 1 filiform bifid or undivided, or 2 distinct from the base; stigmas terminal, small or capitate, ovules 2 to many in each cell. *Capsule* loculicidally, sometimes septicidally, bi-valved, the placentas if parietal attached to the valves, if central remaining free. *Seeds* usually oblong, globose or angular, 2 to many on each placenta, testa reticulate or wrinkled, rarely smooth, albumen fleshy, embryo small, erect, cotyledons plano-convex or semi terete — **DISTRIB** About 150 species, chiefly American, very few in the Old World.

#### HYDROLEA, Linn

Herbs or undershrubs. *Leaves* entire, alternate. *Flowers* blue, in short terminal cymes or racemes. *Calyx* divided nearly to the base, segments lanceolate. *Corolla* widely campanulate, sub-rotate, lobes imbricate. *Stamens* 5, attached to the corolla tube, filaments filiform, sometimes dilated at base, anthers sagittate. *Ovary* completely 2-celled, with fleshy placentas adnate to the dissepiment, styles 2, rarely 3, distinct, filiform, stigmas capitate, ovules many in each cell, multi-seriate. *Capsule* globose or ovoid, septicidal, usually 2-, rarely 3- or 4-valved. *Seeds* minute, irregularly wrinkled — **DISTRIB** About 14 species, chiefly American, with one Chinese, one of tropical Africa, and one of India and Malaya.

*HYDROLA ZYLANICA*, Vahl Symb II 46 (1791) An annual herb, stems nearly glabrous below, glandular pubescent above, soft, somewhat succulent, often rooting, always straggling. *Leaves* membranous, lanceolate or oblong lanceolate, attenuate above and below, 5 to 2 in long, 2 to 5 in broad, glabrous or slightly pubescent, petiole none or very short and winged by the decurrent blade. *Flowers* in racemes on short lateral leafy branches. *Calyx* lobes acute, glandular-pubescent, 3-nerved, about 3 in long. *Corolla* lobes ovate, 2 in long, many nerved, blue. *Stamens* with sagittate, often twisted anthers, and filaments dilated at base. *Capsule* shorter than the calyx-lobes, ovoid, 2-lobed, placentas central, adherent at their backs to the dissepiment. *Seeds* very many,

oblong, obtuse, testa very faintly wrinkled Lamk III t 184, Wall Cat 4398, W & A in Hook Comp Bot Mag II 193, t 26, Wight III t 167, and Ic t 601, Choisy in DC Prod X 160, Dalz & Gibs Bomb Fl 170, Miq Fl Ind Bat II 633, Clarke in Hook f Fl Br Ind IV 133, Trimen Fl Ceyl III 191 Cooke Bomb Fl II 197, Prain Beng Plants 711 *H. javanica*, Blume Bijdr 725 *Namazyanica*, Linn Sp Pl 226, Roxb Fl Ind II 73 "Tjeru Vallel," Rheede Hort Mal X. t 28

PERAK. Wray 2571, 3336, *Scortechini*, Ridley 2906, *Kings Collector* 391, 2577 —DISTRIB. Throughout India, Ceylon, Burma, Siam, Java, Malaya, China, the Philippines, also in Australia, tropical Africa and America, in wet places and rice-fields

### Order LXXX BORAGINEÆ

Herbs, shrubs, or trees, often conspicuously hispid or scabrous. *Leaves* alternate very rarely opposite, ex stipulate, usually entire, rarely in verticil. *Flowers* usually in scorpioid dichotomous cymes, sometimes trichotomously paniculate, rarely solitary and axillary, bracteate or not, hemiphradite. *Calyx* inferior, 5 lobed (rarely 6 to 8 lobed), the lobes imbricate, rarely valvate, usually persistent in fruit. *Corolla* gamopetalous, of various forms, often with scales in the throat, the limb 5 lobed (rarely 4 to 6 lobed), the lobes imbricate, rarely twisted. *Stamens* as many as the lobes and alternate with them, inserted on the tube, anthers ovate to linear, introrse, filaments slender, often dilated at the base. *Disk* under the ovary or obsolete. *Ovary* superior, sessile, cells 2 with 2 ovules in each, or 4 with 1 ovule in each, style terminal or from the depression between the lobes of the ovary, long or short, stigma entire and capitate or 2 lobed, the style rarely twice bifid. *Ovules* sub erect from the basal angle of the cell. *Fruit* drupaceous with a hard 2 to 4 celled endocarp or dividing into 2 or 4 nutlets with thin or fleshy walls. *Seeds* erect or oblique, with membranous testa and fleshy albumen or ex albuminous, embryo curved or straight, radicle superior —DISTRIB. Universal Species about 1,500

Styles twice partite, drupe 4 1 seeded, trees or shrubs, calyx enlarging in fruit

1 CORIARIA

Styles simple or only bi partite, rarely (*Coldenia*) 2 or more and distinct, drupe including two 2 seeded or four 1 seeded pyrenes, calyx only slightly or not at all enlarged in fruit —

Styles depressed conical at the apex or with a horizontal ring below or at the stigmas

- Styles short, shortly 2-lobed; pyrenes two 2-seeded; herbs or shrubs .. .. 2. *TOURNEFORTIA*.  
 Styles elongated, dilated at the apex; pyrenes four 1-seeded, much resembling nutlets; herbs .. .. 3. *HELIOTROPIMUM*.  
 Styles elongated, not dilated or annular at the apex, more or less bi-partite.—  
 Styles 2-fid at the apex; pyrenes two 2-seeded, or four 1-seeded; trees or shrubs .. .. 4. *EBRETIA*.  
 Styles more or less separate, distinct at base and apex, united but easily separable in the middle; pyrenes four 1-seeded, much resembling nutlets; prostrate herbs .. 5. *COLDENIA*.

1. *CORDIA*, Linn.

Trees or shrubs. *Leaves* alternate, rarely sub-opposite, petiolate. *Flowers* in dichotomous cymes with scorpioid branches, or corymbose or in clusters, ebracteate, polygamous, the ♀ fewer than the ♂. *Calyx* tubular or campanulate, usually with short and often irregular teeth, accrescent in fruit. *Corolla* funnel- or salver-shaped or campanulate; the lobes of the limb 4 to 8, spreading or recurved, white or orange. *Stamens* as many as the lobes; anthers sagittate or hastate, shortly exserted; filaments often hairy near the base. *Ovary* 4-celled, glabrous; style terminal, long, bi-partite, the branches again bifid, linear or sub-spathulate, cells of ovary 1-ovuled. *Fruit* ovoid or ellipsoid, surrounded by the enlarged calyx, the putamen bony, with 1 to 4 cells, but one only with a fertile seed. *Seed* exalbuminous, the cotyledons large and fleshy or thin but always plicate.—*DISTRIB* About 280 species, all tropical.

- Flowers about 1·5 in long .. .. 1. *C. subcordata*.  
 Flowers less than 5 in long --  
   Leaves broadly ovate, sub-acute or obtuse, the base often cordate .. 2. *C. Myza*.  
   Leaves ovate-lanceolate, acuminate, the base cuneate .. 3. *C. Griffithii*.

1. *CORDIA SUBCORDATA*, Lamk Ill. 1899 (1792). A small tree, young branches as thick as a goose-quill, glabrous, pale brown when dry. *Leaves* membranous; broadly ovate or ovate-rotund, the apex acute, the base broadly rounded or sub-cordate, both surfaces brown when dry, the lower paler, harshly and minutely reticulate, main-nerves 4 or 5 pairs, faint on both surfaces when dry, length 3·5 to 6·5 in, breadth 2·5 to 4 in., petiole 1·25 to 2 in. *Corymbs* lateral, few-flowered, shorter than the leaves, glaberrulous, pedicels ·25 in. long. *Calyx* cylindric, slightly widening towards the mouth, 4 in. long and nearly ·2 in. wide at the middle, glabrous; the limb with 3 broad triangular teeth. *Corolla* about 1·3 in. long, orange or reddish, funnel-shaped; lobes about 6, broad, spreading, as long as the tube. *Stamens* 6.

*Stigma* with linear-spathulate branches *Fruit* very bony, pyramidal, its apex acute, with 4 bold angles, the spaces between the angles often with large tubercles, 1 in long and as much in breadth from angle to angle, usually with 1 or more seeds, entirely enveloped in the much inflated glabrous accrescent apiculate calyx Wall Cat 9063, DC Prod IX 477, Seem Fl Viti, t 34 Benth Fl Austral IV 385 Kurz For Fl Burm II 209, Clarke in Hook fil Fl Br Ind IV 140 Miq Fl Ind Bat II 914 *C. orientalis*, R Br Prod 498 *C. campanulata*, Roxb Fl Ind, ed Carey & Wall II 336 *C. humphii* Blume Bijdr 843 *C. hexandra*, Roem & Schult Syst IV 799 Rumph Hicrb Amb II t 75

PERAK *Scortechni* 1084 DINDINGS *Curtis* 3447 KLUANG *Ridley* 5526 PAHANG *Ridley* 2158 —DISTRIB British India, Malay Archipelago, Australia, Sandwich Islands Widely cultivated in other places

2 *Cordia* MEXA, Linn Sp Pl 190 (1753) A tree, 40 to 50 feet high, young branches thinner than a goose quill, glabrous *Leaves* thinly coriaceous broadly ovate apex sub acute or obtuse, the base slightly cordate, upper surface when dry dark brown, glabrous, faintly reticulate, the lower paler brown, distinctly and minutely reticulate the transverse veins very prominent glabrous except for some pubescence on the midrib and 5 or 6 pairs of curved ascending main nerves length 3 to 3.75 in, breadth 2 to 2.75 in petioles .75 to 1.25 in *Cymes* trichotomous, shorter than the leaves, terminal *Male and female* flowers often in the same tree mostly 5 merous *Calyx* campanulate, more than 25 in long glabrous, smooth outside, silky inside *Corolla* with its tube included in the calyx the lobes projecting and 15 in long reflexed style in the ♀ flowers short 4 cleft, absent in the ♂ *Fruit* ellipsoid, with acute apex and rounded base, compressed, with 3 or 4 angles (one or more of them indistinct), 75 in long and 4 in broad, 2 or more seeded the persistent accrescent calyx leathery with strong vertical reticulations widely campanulate, its mouth with shallow irregular crenations, length 25 in, width 4 to 5 in DC Prod IX 479 Delile Fl Egypt t 19, fig 1 Roxb Fl Ind, ed Carey & Wall, II 232, Wall Cat 889 Wight Ill t 169 Benth Fl Austral IV 386 Bodd Fl Sylv t 245, fig A Brandis For Fl 336 (in part) Kurz For Fl Burm II 208 Boiss Fl Or IV 124 Miq Fl Ind Bat II 915, Clarke in Hook fil Fl Br Ind IV 136, Trimen Fl Ceyl III 193, Cooke Fl Bomb II 199, Prun Beng Plants 714 *C. Myra*, var *b. minor* only, Thw Enum Pl Ceyl 214 *C. indica*, Lamk Dict VII 49, DC Prod IX 500 *C. officinalis* and *C. africana*, Lamk Ill II 420, and t 96, fig 3 *C. Seebastena* Persk Fl Aeg Arab LXIII *C. paniculata*, Roth Nov. Spec 121 DC Prod



IX 482 *Sebestena officinalis*, Gaertn. Fruct. I. 364, t. 76. *Ehretia glabra*, Roth Nov Spec 127; DC. Prod. IX. 510. *Bewrrenia glabra*, G Don Gen Syst. 390

MALACCA and SINGAPORE probably introduced —DISTRIB Tropics of the Old World

3 *Cordia Griffithii*, Clarke in Hook. fil Fl Br Ind IV. 139 (1883). A small tree, young branches about as thick as a crow-quill, puberulous, pale and angled when dry. *Leaves* thinly coriaceous, ovate lanceolate, acute or acuminate, the base slightly cuneate, both surfaces brown when dry (the lower the paler), minutely reticulate, glabrous, main-nerves 3 or 4 pairs, curved, ascending, length 1.5 to 3.5 in., breadth 1 to 1.75 in., petioles .65 to 1.25 in. *Cymes* slender, 2.5 to 4 in. long (including their peduncles), dichotomous, lax, few flowered, puberulous. *Flowers* 4 in long, almost sessile. *Calyx* .25 in long, funnel-shaped, the mouth wide, oblique, and with 5 irregular short teeth. *Corolla* funnel-shaped, much longer than the calyx, the limb longer than the tube, deeply divided into 5 narrowly elliptic reflexed lobes. *Stamens* 5, attached to the throat of the tube, anthers oblong, exserted, filaments unequal in length, flattened below. *Ovary* obovoid, smooth, 4-celled, ovules solitary in each cell, style thin and cylindric above, swollen in its lower half, exserted

MALACCA Griffith (K D) 5997, *Muangay* (K D) 1162, *Ridley* 4561  
SELANGOR *Ridley* 7373 KEDAH *King's Collector* 1742

## 2 *TOURNEFORTIA*, Linn

Trees or shrubs, sometimes almost herbs, and often sub-scandent. *Leaves* alternate, entire. *Cymus* scorpioid, dichotomous, usually terminal, rarely lateral or extra-axillary. *Flowers* small, numerous, crowded, sessile or on short pedicels, ebracteate. *Calyx* deeply 4- or 5-partite, the segments ovate or lanceolate. *Corolla* white or greenish, the tube cylindric, naked in the throat, the lobes of the limb 5 or 4, small, spreading. *Stamens* 5 or 4, included in the tube, anthers oblong-ovate or lanceolate, apiculate or not, filaments short. *Ovary* 4-celled, style terminal, short, 2-lobed (in the Indo-Malayan species), ovules 1 in each cell, pendulous from the upper inner part of the cell. *Drupe* small, ovoid, slightly fleshy or leathery, indistinctly separating into two 2-seeded or into four 1-seeded pyrenes. *Seeds* straight or curved, pendulous, albuminous, embryo straight or curved —DISTRIB. About 130 species, in the tropics of both hemispheres

*TOURNEFORTIA WALLICHII*, DC Prod IX 527 (1845) A climber, 10 to 30 feet long, young branches terete, twice as thick as a crow's-quill, minutely rusty-puberulous, becoming glabrous. *Leaves* thickly mem-

branous, ovate, the apex acute or shortly acuminate, the base rounded, slightly oblique, both surfaces when dry brown, the upper quite glabrous, the lower paler, reticulate, sometimes with a few small hairs on the nerves, main-nerves 4 or 5 pairs, curved, ascending, depressed like the midrib on the upper surface, prominent on the lower, length 2 to 3.5 in, breadth .75 to 1.75 in, petioles 3 to 4 in. Cymes terminal and lateral (extra-axillary), on long peduncles, dichotomously branched, sub-glabrous. Flowers 3 to 4 in long, sessile, forming crowded one-sided pseudo spikes (scorpioid cymes) on the terminal inch or two of the branches of the cymes. Calyx about .05 in long, only about a sixth or a seventh as long as the corolla, cleft nearly to the base into 4 broadly triangular acute spreading segments. Corolla tube 4-angled, the limb short, with 4 ovate teeth, glabrous. Anthers 4, oblong, sessile or nearly so, near the throat. Fruit broadly ovoid, 1.5 to 2 in long, with 4 vertical grooves (2 of them deep) on the sides, and a depression on the apex. Clarke in Hook fil Fl Br Ind IV 147. *Tetrandia*, Wall Cat 911 (not of Blume). *Tetrandia Wallichii*, Miq Fl Ind Bat II 928.

SINGAPORE *Maingay* (K D) 1165, 8041, *King's Collector* 302. PERAK *Wray* 3536, *Ridley* 2431, *King's Collector* 3335, 5158. *Scortechium* 1494.—DISTRIB Java, Sumatra.

### 3 HETIOTROPIUM, Linn

Annual or perennial herbs, very hairy or scabrous. Leaves alternate. Flowers small, white, or pale purple, sometimes in terminal dichotomous cymes with scorpioid branches and small or no bracts, sometimes axillary in the axils of large bracts. Calyx divided into 5 linear or lanceolate segments. Corolla with a cylindric tube and limb of various shapes, the lobes of the latter always imbricate or induplicate in bud, spreading in flower. Stamens 5, included, inserted on the tube by short filaments, anthers ovate oblong or lanceolate. Ovary completely or imperfectly 4 celled, 4 ovulate, style short or long, terminal, with a depressed conical or flat disk on its apex, stigma above the disk, none or short or elongate, entire or rarely bifid. Fruit dry, 2 to 4-grooved or -lobed, and consisting of 4 nutlets free from the beginning or finally becoming so. Seeds straight or curved, albumen none, small or large, cotyledons plano convex.—DISTRIB Species about 225, widely distributed in both hemispheres.

Leaves ovate lanceolate, 1.5 to 2.5 in long

1 *H. indicum*

Leaves linear, .5 to 1 in long .

2 *H. strigosum*

1 HETIOTROPIUM INDICUM, Linn Sp Pl 130 (1753) Herbaceous,

but woody at the base, a foot or two in height, with few branches; the branches, lower parts of the inflorescence, and the petioles with white stiff hairs. *Leaves* membranous, greenish-brown when dry; ovate or ovate-lanceolate, slightly inequilateral, the apex usually acute, the base rounded, irregularly cordate, often unequally so; both surfaces with some scattered long white hairs; the lower surface pale and faintly reticulate when dry, main-nerves 6 to 8 pairs, rather straight, ascending, slightly prominent on the lower surface; length 1.5 to 2.5 in., breadth .75 to 2 in.; petioles .4 to 1.5 in. *Cymes* scorpioid, terminal and lateral (extra-axillary), about 2 in long (lengthening with age to 5 or 6 in.), on peduncles about 1 in. long; the rachises hispid, compressed when dry. *Flowers* about .15 in. long, sessile, numerous. *Calyx* about .05 in. long, deeply divided into 5 narrowly lanceolate sub-erect hispid segments. *Corolla* tubular, slightly dilated at the base; the limb with 5 broad blunt reflexed lobes, anthers 5, included, inserted about the middle of the tube. *Fruit* .1 in. long, conical, with an apical beak and with 4 bold vertical ridges and 4 faint ones, glabrous naturally separating into 2 halves, each half consisting of 2 cohering pyriform pyrenes with long beaks and a single large sub-quadrate white seed Roxb Fl. Ind I 454, Bot Mag. t. 1837; Clarke in Hook. fil. Fl. Br. Ind IV. 152, Trimen Fl. Ceyl. III. 200; Cooke Fl. Bomb. II. 207, Prain Beng. Plants 716. *H. anisophyllum*, Beauv Fl. Ow. et Ben II. 62, t 96. *Tiaridium indicum*, Lehm. Asperifol. 14, Wall. Cat. 913; Wight Ill t 171. *T. anisophyllum*, G. Don Gen. Syst. IV. 364. *Heliotropium indicum*, DC. Prod. IX. 556; Fresen. in Mart. Fl. Brasil, fasc 22, 48, t 10, fig 4, Miq Fl. Ind Bat II 925 *H. velutnum*, DC. l.c. 557

SINGAPORE *King's Collector* 318, *Hullett* 21. PAHANG: *Ridley* 1547. PENANG *Deschamps* PERAK. *Scortechini* 163.—DISTRIB India, Malaya, E Asia, tropical Africa and America

2. *HELIOTROPION STRIGOSUM*, Willd. Sp. Pl I 743 (1797) Herbaceous, woody at the base, erect, a foot high, the branches few, slender, long, not spreading, very strigose, like all the rest of the plant. *Leaves* linear, .5 to 1 in long, very narrow, becoming smaller upwards. *Flowers* under 1 in. long, their pedicels longer, sub-opposite to a linear bract or often extra-axillary. *Sepals* ovate-acute, enlarging in fruit. *Corolla* salvei-shaped, stigma narrowly conical. *Fruit* depressed, 4-lobed, under .1 in. broad, glabrous and shining, sometimes with a few small hairs. DC. Prod. IX. 546, Clarke in Hook. fil. Fl. Br. Ind IV 151; Boiss. Fl. Orient. IV. 143; Prain Beng. Plants 716. *H. brevifolium*, Wall. Cat. 914, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 2; DC. l.c. 546. *H. compactum*, Don Prod. 101

In all the provinces, by waysides, not common —DISTRIB From W Asia through India to Australia

4 EURETIA, Linn

Glabrous or scabrous shrubs or trees *Leaves* alternate entire or dentate *Flowers* small, usually white in axillary or terminal corymbs or panicles, rarely on 1 flowered axillary peduncles *Calyx* small, 5 partite *Corolla* with short cylindric tube, the limb with 5 obtuse imbricate spreading lobes *Stamens* 5 inserted on the tube exerted, rarely included, ovate or oblong *Ovary* 2 celled, the cells bi ovulate sometimes imperfectly 4 celled and the cells with solitary ovules *style* terminal, cylindric, bifid or bi partite, stigmas small, capitate or clavate *Drupe* small, usually globose, 4 seeded or (by suppression) 1-3 seeded, usually dividing into 2 bilocular or into 4 unilocular often compressed pyrenes *Seeds* straight with little albumen and thin testa —DISTRIB About 55 species, all tropical, chiefly in the Old World

Leaves ovate to elliptic oblong shortly acuminate with about 5 pairs of main nerves

1 *E. laevis*

Leaves obovate or obovate elliptic obtuse retuse or sub acute with 7 or 8 pairs of main nerves

2 *E. parallela*

1 EURETIA LAEVIS Roxb Col Pl I 42, t 55, var *timorensis* Clarke in Hook fil Fl Br Ind IV 142 (1883) A small tree, young branches rusty puberulous becoming ultimately glabrous dark coloured when dry *Leaves* thinly coriaceous ovate to elliptic oblong shortly acuminate, the base slightly cuneate or sometimes rounded, both surfaces glabrous brown when dry, the lower pale and reticulate main nerves about 5 pairs rather straight ascending slightly thin but prominent on the lower surface like the midrib, length 2.5 to 5 in breadth 1.25 to 2.25 in petioles about 4 in *Cymes* axillary and terminal, shorter than the leaves, corymbose puberulous, the ultimate branches scorpioid *Flowers* small numerous, sessile *Calyx* less than 1 in long, its mouth with 5 oblong lobes *Corolla* tube 1 in long, the lobes 5, shorter and spreading *Antlers* exerted *Fruit* when 4 seeded about 2 in in diam, smaller when 2 seeded depressed globose, ribbed, pyrenes 4 or 2, sometimes only 1 each with a single seed, the persistent calyx much shorter than the fruit, its lobes acuminate *E. timorensis*, Dene in Nouv Ann Mus d Hist Nat III 395 DC Prod IX 505 *E. philippinensis*, DC l c 504 *E. laevis*, Benth Fl Austral IV 389

MALACCA *Mangay* (K D) 1164 Ridley 3302 PERAK *Scotchum*

167, 898, *King's Collector* 7436, 8344 —DISTRIB Burma, *Griffith* (K.D.) 6002, Malay Archipelago, Australia

2 *EHRETIA PARALLELA*, Clarke in Hook fil Fl Br Ind IV. 143 (1883) A shrub, all parts except the inflorescence glabrous, young branches thinner than a goose quill, pale when dry *Leaves* membranous; obovate or obovate-elliptic, obtuse, from retuse to sub acute, cuneate at the base, both surfaces dark brown when dry, main nerves 7 or 8 pairs, scarcely curved, ascending, parallel, very bold and distinct on the lower surface like the midrib (when dry), faint on the upper, length 1.5 to 1.75 in, breadth .75 to 1 in, petiole .25 in Inflorescence, flowers, and fruit as in *E. laevis*, Roxb, var *timorensis*, but smaller

PLNANG *Curtis* 1572 —DISTRIB Burma, *Griffith* (K.D.) 6004

### 5 *COLDENIA*, Linn

Much branched, diffuse or prostrate scabrous herbs *Leaves* alternate, crisped *Flowers* small, axillary, sessile or sub-sessile, the upper sometimes in a short one sided bracteate cyme *Calyx* 4-5 partite *Corolla* with short funnel shaped tube and 4 or 5 spreading segments imbricate in bud *Stamens* 4 or 5, inserted on the tube, anthers ovate *Ovary* broadly ovoid, 2-celled, with 2 ovules in each cell, or imperfectly 4-celled with 1 in each, styles 2, distinct at the base but united upwards (although easily separable), stigmas 2, capitate *Fruit* almost dry, composed of 4 sub connate 1 seeded pyrenes, seeds with thin testa and little if any albumen, the cotyledons plane —DISTRIB Species 12, 10 of which are American, 1 African, and the undernoted which is cosmopolitan

*COIDENIA PROCUMBENS*, Linn Sp Pl 125 (1753) A scabrous-hairy prostrate herb *Leaves* elliptic-obovate, coarsely and deeply serrate, almost pinnatifid *Fruit*, prior to disintegration into its component pyrenes, pyramidal Gaertn Fruct I 329, t 68, Lamk Ill t 69, Roxb Fl Ind I 448, Wall Cat 942, DC Prod IX 558, Miq Fl Ind Bat II 933, Clarke in Hook fil Fl Br Ind IV 144, Trimen Fl Ceyl III 197, Cooke Bomb Fl II 205, Ptain Beng Plants 718 *Lobophyllum tetrandrum*, F Muell in Hook Kew Journ Bot IX 21 *Waltheria microphylla*, Miq in Pl Hohenack n 87b (not of Cav)

By waysides, not common —DISTRIB Everywhere in the tropics

## Order LXXXI CONVULVULACEÆ

[By D. PRAIN]

Herbs or shrubs, usually twining, occasionally erect, very rarely trees, sometimes parasitic *Leaves* alternate or in parasitic species

obsolete, stipules 0 Flowers in cymes, rarely solitary, regular, hermaphrodite, bracts at cyme bases or under solitary flowers opposite; bracteoles at base of pedicels small, scale-like Sepals 5, imbricate, occasionally slightly connate below, often persistent, sometimes accrescent Corolla campanulate or infundibuliform, rarely sub-rotate, limb with 5 short or long lobes often plicate in bud, after flowering either involute or reverting to the original aestivation. Stamens 5, adnate to corolla tube, anthers oblong, opening by longitudinal introrse or lateral slits Carpels usually 2, very rarely 3 or more, connate throughout in a superior ovary with its base often encircled by an annular or lobed disk, and its cells as many or, by development of accessory partitions, twice as many as the component carpels, rarely, from absorption of dissepiments, fewer than carpels, ovules 2 in each carpel, sessile erect anatropous, style solitary or rarely styles 2, stigma capitate or 2-lobed or 2-fid Fruit an indehiscent often dry berry, or a 2-4-valved or circumscissile or irregularly opening capsule Seeds 4 to 2, rarely solitary, erect, albumen scanty or 0, cotyledons generally plicate, rarely flat — DISTRIB Species about 1,000, in all regions, but more abundant in sub tropical and tropical countries

Corolla tube usually uniformly enlarged from base to apex, the 5 bands or lobes rarely, except in *Lycium*, clearly defined from the intervening spaces, pollen not spinulose —

Yellow parasitic twining leafless herbs

1 CUSCUTA

Green non parasitic leafy herbs shrubs or trees —

Fruit indehiscent, woody or fleshy, rather large, style short or 0, stigma 5-10 rayed, corolla lobes 2 fid, the lobules induplicate, contorted, woody, climbing shrubs or erect trees Fruit dehiscent, or if indehiscent small, with thin fragile walls

2 ERYCIBE

Flowers in racemes or panicles —

Bracts not enlarged in fruit, outer 3 or all of the sepals enlarged in fruit, style entire or shortly 2 lobed, capsule indehiscent or rarely 2 valved

3 PORANA

Bracts in fruit much enlarged, scarious, adnate to calyx, sepals not enlarged, capsule 4 valved 1 seeded

4 NEUROPEPTIS

Flowers in cymes or solitary, capsule valvate or opercular, rarely dehiscent irregularly —

Styles 2, free or partially united below, sepals not or slightly enlarging in fruit —

Capsule 4 valved, 2 1 locular, 4 2 seeded, styles quite free, each 2 branched, cymes few flowered

5 EVOLVULUS

Capsule irregularly dehiscent, splitting into numerous vertical segments, styles usually partially united below, stigmas capitate, cymes sub capitate ..

6 BONANIA

Style entire, stigmas usually 2 —

Ovary 1 locular, capsule 4 valved, 4 seeded, stigmas shortly oblong, calyx lobes not enlarged in fruit —

- Bract enveloping the calyx; pollen spherical .. 7. *CALYSTEGIA*.  
 Bract not enveloping the calyx; pollen polyhedral .. 8. *HEWITTIA*.  
 Ovary 2-locular, sometimes 4-locular:—  
 Outer 3 sepals much larger than the 2 inner, and  
 decurrent on the peduncle; stigmas capitate .. 9. *ANISFIA*.  
 Outer 3 sepals not larger than the 2 inner, and not  
 decurrent on the peduncle:—  
 Stigmas elliptic; capsule 8-valved, rarely 4-valved 10. *JACQUEMONTIA*.  
 Stigmas globose:—  
 Capsule 4-valved; fruiting sepals not enlarged;  
 bands of corolla usually with 5 purple lines;  
 stems not winged .. 11. *MERREMIA*.  
 Capsule with circumscissile dehiscence; fruiting  
 sepals considerably enlarged; bands of corolla  
 without lines, stems winged .. 12. *OPERCULINA*.  
 Corolla-tube not uniformly enlarged from base to apex, the  
 5 bands on the lobes clearly defined by 2 prominent lines; pollen  
 spinulose:—  
 Fruit dehiscent, or if indehiscent then with thin fragile walls:—  
 Stamens arising from the backs of 5 scales attached to  
 the corolla-tube; flowers small urceolate, fasciculate, fruit  
 4-valved .. 13. *LEPISTEMON*.  
 Stamens arising directly from the corolla-tube.—  
 Corolla more or less campanulate; calyx-lobes never  
 aristate, inflorescence never scorpioid; stamens not ex-  
 serted .. 14. *IPOMOEA*.  
 Corolla more or less hypocrateriform; calyx-lobes aristate,  
 or if obtuse the inflorescence scorpioid; stamens exserted.—  
 Flowers rather small, pink or red, slightly irregular .. 15. *QUAMOCUIT*.  
 Flowers large white, regular .. 16. *CALONYCTION*.  
 Fruit indehiscent, coriaceous or fleshy.—  
 Ovary 4-celled .. 17. *ARGYRIA*.  
 Ovary 2-celled .. 18. *LETTESOMIA*.

1 *CUSCUTA*, Linn.

Leafless twining yellow-reddish parasitic herbs. *Flowers* small, white or rose-coloured, fascicled, sessile or shortly pedicelled; bracts small or 0. *Sepals* 5 or 4, sub-equal; free or shortly connate at the base. *Corolla* ovoid or campanulate, usually with a ring of fimbriate or lobed scales near the base or below the stamens; lobes short, imbricate. *Stamens* 5 or 4, adnate near throat of corolla; filaments short, linear; anthers oblong, partially exserted. *Ovary* more or less completely 2-celled; ovules 4; styles 2 or 1; stigmas 2. *Fruit* a globose or ovoid, dry or succulent, circumscissile or irregularly bursting 4-2-seeded capsule. *Seeds* glabrous, albumen fleshy; embryo slender, spiral; cotyledons minute or obsolete.—*DISTRIB.* Species about 80, in temperate and tropical regions.

*CUSCUTA HYGROPHILÆ*, H. H. W. Pears. in Hook. Ic. Plant. t. 2704.

A small slender parasitic twiner. *Flowers* in dense umbellate cymes, .25 in. wide. *Sepals* ovate obtuse, connate below, .1 in. long. *Corolla* .15 in. wide, campanulate; lobes ovate obtuse. *Stamens* 5, shortly exerted. *Scales* near base of corolla-tube shortly fimbriate. *Ovary* obtuse, more or less perfectly 2-celled; ovules 4; styles 2; stigmas capitate. *Fruit* an oblate capsule, .15 in. wide.

JOHORE: near the town, parasitic on *Hygrophila quadrivalvis*, Ridley 9161!

Closely related to *C. chinensis*, from which it differs in having the sepals without keels, and of which the writer believes it to be a form.

## 2. ERYCIBE, Roxb.

Shrubs, scandent or diffuse, less often erect; rarely trees. *Leaves* alternate, elliptic, entire, coriaceous. *Flowers* rather small, cymes in axillary or terminal panicles or racemes; bracts lanceolate, small. *Sepals* 5, small, sub-equal, orbicular, coriaceous, adpressed to base of fruit. *Corolla* rather small, white or yellowish, sub-rotate; tube hirsute externally; limb 5-lobed, the lobes obcordate, induplicate-contorted in bud, with a thicker triangular centre externally hirsute, and sub-membranous semicordate in margins glabrous on both sides. *Stamens* 5, sub-included, adnate to throat of corolla; filaments short; anthers ovate-lanceolate. *Ovary* globose, 1-celled; ovules 4; stigma large, sessile, sub-globose or conic, 5- or 10-ridged. *Fruit* a fleshy, leathery or woody berry, ovoid or ellipsoid. *Seed* solitary, glabrous; albumen scanty, intruded between folds of fleshy cotyledons.—DISTRIB. Species about 30; throughout S.E. Asia.

Leaves more or less pubescent beneath —

Pubescence on under surfaces of leaves persistent.—

Branches angular; bark fissured; pubescence on under side of leaves black, closely adpressed, leaves with acuminate tips, the lateral nerves in 5 pairs, obliquely ascending, hardly visible above .. .. .

1. *E. strigosa*.

Branches cylindric; bark not fissured: pubescence on under surface of leaves not adpressed, brown or tawny; leaves obtuse, the lateral nerves in 12 to 15 pairs, spreading not very oblique, fruit velvety .. .. .

2. *E. magnifica*.

Pubescence on under surface of leaves usually disappearing, except from the midrib, as the leaves become old; branches with fissured bark:—

Flowers in pyramidal terminal panicles, the panicle branches subtended by foliaceous bracts .. .. .

3. *E. expansa*.

Flowers in axillary cymes, or if passing into a terminal panicle the panicle branches not subtended by foliaceous bracts:—



- Flowers often passing into a terminal panicle; corolla greenish; fruit ellipsoid, black, .6 in. long, .85 in. wide .. 4. *E. Princei*.
- Flowers all axillary; corolla white; fruit ellipsoid, purple, with a faint apical areola, .75 in. long, .5 in. wide .. 5. *E. malaccensis*.
- Leaves quite glabrous on both surfaces:—
- Flowers in both terminal and axillary panicles; leaves with lateral nerves distinct, but secondary venation indistinct .. 6. *E. angulata*.
- Flowers always axillary:—
- Leaves small, never exceeding 1.75 in. long, sub-bifarious; flowers solitary, axillary.. .. 7. *E. leucozylioides*.
- Leaves medium to large, very rarely, and never all, less than 2 in. long, arranged spirally; flowers never solitary:—
- Lateral nerves of leaves distinct and secondary reticulate venation distinct on both surfaces, or at least beneath:—
- Lateral nerves of leaves 7 to 9 pairs .. .. 8. *E. festiva*.
- Lateral nerves of leaves 6 or fewer pairs:—
- Fruit quite glabrous .. .. 9. *E. sapotacea*.
- Fruit finely velvety .. .. 10. *E. Stapfiana*.
- Lateral nerves of leaves indistinct, secondary venation not visible:—
- Corolla rufous-pubescent internally as well as externally .. .. 11. *E. praeipua*.
- Corolla glabrous internally:—
- Flowers densely glomerate in leaf axils; leaves pale waxy greenish yellow beneath .. .. 12. *E. glomerata*.
- Flowers in short but open axillary cymes:—
- Leaves thickly coriaceous; fruit verrucose but not scurfy externally .. .. 13. *E. aenea*.
- Leaves sub-coriaceous, fruit scurfy but not verrucose externally .. .. 14. *E. Griffithii*.

1. *ERYCIBE STRIGOSA*, Prain Journ. As. Soc. Beng. LXV. 2. 536. A climber 40 to 60 feet long, with stems 1 to 2 in. in diam.; branches slightly angled with fissured bark, and except along the fissures densely clothed with black adpressed tomentum; branchlets angular with black adpressed tomentum. *Leaves* elliptic or ovate-lanceolate, base cuneate, apex rather long acuminate, with tip obtuse; 3 to 4 in. long, 1.5 to 1.75 in. wide; thinly coriaceous; dark green, quite glabrous above, brownish-black and densely covered with black adpressed tomentum beneath; lateral nerves 5 pairs, oblique, distinct beneath not visible above, secondary venation indistinct beneath not visible above; petiole .75 to 1 in. long, with close adpressed black tomentum. *Flowers* in few-flowered cymes, .25 in. across, disposed in narrow axillary panicles 3 to 6 in. long, .5 in. wide; main-rachis angular, densely rusty-pubescent, the peduncles of individual cymes .25 in. long or less, densely rusty-pubescent, as are the linear deciduous bracteoles .15 in. long, and the very short pedicels. *Sepals* orbicular, rusty-pubescent. *Corolla* white, .3 in. across (but not quite fully opened), the lobes spreading, glabrous

within; interlobular spaces brown tomentose externally; lobules ovate, their margins sub-entire. Hallier f. Bull. Herb. Boiss. V. 737.

PERAK: Thaiping, 500 to 800 feet elevation; *King's Collector* 8461!

2. *ERYCIBE MAGNIFICA*, Prain Journ. As. Soc. Beng. LXXIII. 2. 18. A strong creeper 80 to 100 feet long, stem 2 to 3 in. in diam.; old branches .75 in. in diam. still densely tomentose, quite cylindric, with large pith; branchlets .3 in. in diam., densely velvety with a tawny to rusty matted tomentum. *Leaves* elliptic or elliptic-obovate, with a narrowly truncate or rounded base, and an obtuse or sometimes retuse apex, the margin strongly revolute; 8 to 10 in long, 3.5 to 4 in. wide; coriaceous; upper surface quite glabrous, dark green and shining with sometimes a silvery, sometimes a rich coppery sheen; under surface velvety, pale brownish-green, the tomentum longer, looser, and sometimes whitish on the main-nerves; lateral nerves rather straight, spreading, 12 to 15 pairs, rather distinctly looped along the margin, prominent beneath, deeply impressed above, as is the secondary reticulate venation; petiole .35 in. long, densely rusty-velvety. *Flowers* in short axillary racemes, sometimes clustered, of close-set 2-3-flowered individual cymules; the racemes 1 to 2 in. long; peduncles, short pedicels and small ovate bracts and bracteoles densely rusty-velvety. *Sepals* orbicular, densely velvety outside, quite glabrous within, coriaceous, in fruit .2 in. across. *Corolla* .5 in. across; lobes slightly spreading, glabrous within, and waxy white or yellow, narrow and deeply divided; interlobular spaces densely dark brown, almost black velvety-pubescent externally; lobules very small oblong. *Fruit* ellipsoid, 1.25 in. long, 1 in. in diam., densely softly velvety, of a rich brown colour

PERAK: *King's Collector* 3454! 3879! 6721!

In the first of his three gatherings Kunstler has noted this as a tree 50 to 70 feet high, but in the two subsequent ones as a large creeper, which is, from the appearance of the specimens, undoubtedly the case with the first gathering also.

3. *ERYCIBE EXPANSA*, Wall. Cat. 1331. A large climber, branches angled, with fissured bark, glabrous; branchlets angular, densely rusty-tomentose. *Leaves* elliptic or slightly obovate, apex abruptly shortly acuminate to a sharp tip, base rounded or sub-cordate; 2 to 2.5 in. long, 1 to 1.5 in. wide; chartaceous; dark green, quite glabrous above, paler and rusty-pubescent, especially on the nerves, beneath, the pubescence ultimately disappearing except from the nerves in old leaves; lateral nerves 2 to 3 pairs, very oblique, ascending, secondary reticulate venation fairly visible above only; petioles .15 in. long, densely rusty-pubescent. *Flowers* in rather condensed 5-9-flowered cymes disposed in pyra-

midal terminal panicles 3 to 15 in. long, 1·5 to 6 in. wide, the main rachis and branches densely rusty-tomentose, the panicle branches ·75 to 2·5 in. long, subtended by large foliaceous bracts ·4 to 1 in. long, exactly like the foliage leaves but smaller; peduncles of individual cymes rusty-tomentose, ·25 in. long; pedicels bracteolate, ·1 in. long or less, rusty-tomentose. *Sepals* orbicular, rusty-pubescent. *Corolla* white, or white tinged with pink, ·45 in. wide; lobes spreading, glabrous within; interlobular spaces densely rusty-pubescent externally; lobules ovate acute, their margins sub-entire. G. Don Gen. Syst. IV. 392; Clarke in Hook. f. Flor. Brit. Ind. IV. 181; Prain Journ. As. Soc. Beng. LXIII. 2. 84; Hallier f. Bull. Herb. Boiss. V. 737. *E. ferruginosa*, Griff. Notul. IV. 283. *E. paniculata*,  $\beta$ . *expansa*, Choisy Ann. Sc. Nat. 2. I. 222; DC. Prod. IX. 464. *E. coriacea*, Kurz For. Flor. Burm. II. 213 partly (not of Wall.).

KEDAH: Lankawi, Curtis 2128!—DISTRIB. Tenasserim.

4. *ERYCIBE PRINCEI*, Wall. Cat. 1335. A large straggling bush with spreading branches, or a stout climber; branches glabrous, the bark more or less fissured but quite cylindric; branchlets densely rusty-tomentose, cylindric. *Leaves* obovate-oblong or rarely obovate-lanceolate, narrowed slightly to the narrowly truncate or sometimes rounded base, more abruptly to the shortly acuminate or acute apex, with an obtuse or occasionally acute tip; 2·5 to 4 in. long, 1·25 to 1·75 in. wide, coriaceous, shrinking somewhat irregularly when dry; glabrous rather pale green above, beneath at first rusty pubescent with a loose tomentum, which soon disappears except from the midrib; lateral nerves 5 to 7 pairs, very oblique and not very prominent on either surface, with a distinct sub-marginal looping vein; secondary reticulate venation distinct but not prominent on either surface, petiole ·2 to ·25 in. long, rusty-pubescent. *Flowers* in axillary cymes in the uppermost leaf axils, 5-9-flowered, ·75 in. wide, the ultimate 3 to 7 passing into a terminal panicle without leaves 1·5 to 3 in. long, rarely longer; peduncles ·15 to ·25 in. long, rusty-pubescent, pedicels very short and lanceolate bracteoles, ·2 in. long, rusty-pubescent. *Sepals* orbicular, coriaceous, rusty-pubescent. *Corolla* greenish, sweet-scented, ·4 in. across; lobes slightly spreading; interlobular spaces shining golden silky externally; lobules ovate, margins finely undulate. *Fruit* ellipsoid, black, smooth, ·6 in. long, ·35 in. in diam. Choisy in Ann. Sc. Nat. 2. I. 224; DC. Prod. IX. 464; Clarke in Hook. f. Flor. Brit. Ind. IV. 152; Prain Journ. As. Soc. Beng. LXIII. 2. 85; Hallier f. Bull. Herb. Boiss. V. 737 (excluding the Assam and Khasia localities), 1052. *E. campptobotrya*, Miq. Flor. Ind. Bat. Suppl. 578.

MALACCA: Griffith 5883 (K.D.)! *Manngay* 1155 (K.D.)! SINGA-

**PORE:** in hedges, frequent, *Kurz* 2968! *Hullett* 628! 642!—**DISTRIB.** Bangka, Sumatra, Borneo.

5. *ERYCIBE MALACCENSIS*, Clarke in Hook. f. *Flor. Brit. Ind.* IV. 182. A stout spreading shrub with straggling branches, or a climber extending to 100 feet in length; branches glabrous, with fissured bark, but cylindric; branchlets stellately puberulous, rather distinctly angled. *Leaves* elliptic, oblong or obovate-oblong, narrowed from the middle or beyond to the cuneate or narrowly truncate base and more abruptly to the shortly acuminate apex with obtuse tip; 3 to 3.5 in. long, 1.25 to 1.5 in. wide; thickly chartaceous; dark green, shining, quite glabrous above; paler glaucescent beneath and at first pubescent with a deciduous tomentum which soon disappears except from the rusty midrib; lateral nerves 5 to 6 pairs, usually very oblique, rather distinct on both surfaces as is the secondary reticulate venation; petiole .25 in. long, rusty-tomentose. *Flowers* in axillary 5-9-flowered cymes, .5 in. wide; peduncles .2 to 1.5 in. long, rusty-tomentose; bracteoles elliptic, fulvous-tomentose, small; pedicels .15 in. long, rusty. *Sepals* orbicular, fulvous-tomentose. *Corolla* glabrous within, white, .35 in. across; lobes slightly spreading; interlobular spaces fulvous-tomentose externally; lobules ovate, margins slightly undulate. *Fruit* ellipsoid, purple, .75 in. long, .5 in. in diam. with a faint apical areola, glabrous. *Prain Journ. As. Soc. Beng.* LXIII. 2. 85; *Hallier f. Bull. Herb. Boiss.* V. 798.

**PERAK:** Larut, *King's Collector* 3093! 3180! 3575! *Scortechini* 2196! Kota, *Wray* 2412! **PENANG:** *Maingay* 1154! **MALACCA:** Bukit Labukor, *Ridley* 3526! Batu Tiga, *Derry* 1042!—**DISTRIB.** Tenasserim.

6. *ERYCIBE ANGULATA*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 84. A robust scandent shrub or a strong climber; stems sometimes over 100 feet long and 4 to 6 in. in diam.; branches terete, glabrous; ultimate branchlets angular, rusty-pubescent. *Leaves* obovate, base cuneate or rounded, apex shortly acuminate or rounded or sometimes deeply emarginate (normally shortly acuminate); 4 to 8 in. long, 2 to 4 in. wide; coriaceous, quite glabrous; lateral nerves 5 to 8 pairs, visible above, distinctly raised beneath; secondary venation indistinct; petioles .5 in. long, rusty-pubescent. *Flowers* in few-flowered cymes disposed in axillary and terminal panicles with angular rachis clothed with dark-red tomentum; axillary inflorescences 1 to 6 in. long, 1 to 1.5 in. wide, terminal 7 to 10 in. long, with sometimes floral leaves intermixed, pedicels bracteolate, .25 to .5 in. long. *Sepals* orbicular, outer stellately rusty-tomentose, inner ciliate. *Corolla* white, .5 in. wide; lobes spreading; interlobular spaces hirsute externally; lobules glabrous, ovate-oblong, with slightly undulate margins. *Hallier f. Bull. Herb.*

Boiss. V. 739. *E. paniculata*, Miq. Flor. Ind. Bat. Suppl. 248 (not of Roxb.).

PERAK: Larut, King's Collector 7379! Dijong, Scortechini 1816!—  
DISTRIB. Sumatra (Teysmann 3682).

When originally describing this species the writer referred to it a Java specimen collected by Kurz; Dr. Hallier, however, whose knowledge of *Convolvulaceae* is so profound, has shown that this Java specimen, which is not a very good one, belongs in reality to a distinct species—*E. macrophylla*, Hallier f.

7. *ERYCIBE LEUCOXYLOIDES*, King MSS. ex Ridl. in Herb. Singap.; Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A very large climber with slender cylindric branches, bark fissured and covered with a close grey pubescence; branchlets numerous, very slender, rather distinctly angled, grey- or rusty-pubescent. *Leaves* sub-bifarious, ovate or ovate-lanceolate, base rounded, apex sub-acuminate or abruptly narrowed to an obtuse tip; 1 to 1.75 in. long, .4 to .6 in. wide; membranous or thinly chartaceous; quite glabrous on both surfaces; rather dark green above, paler beneath; secondary nerves about 3 pairs, very oblique and hardly visible above except in young leaves, not visible beneath even when dry and even when young; petiole .1 in. long, grey-pubescent. *Flowers* axillary, solitary; pedicels .2 in. long, somewhat recurved in fruit, grey-pubescent, bracteolate under the calyx. *Sepals* orbicular, sparsely pubescent on the centre externally, elsewhere glabrous except the ciliate margins. *Corolla* white, sweet-scented, .5 in. across; interlobular spaces brown-tomentose externally; lobules broad, semi-orbicular, entire. *Fruit* elliptic, black, smooth, glabrous, .6 in. long, .4 in. wide.

SINGAPORE: climbing in secondary jungle, Hallier! Ridley 2051, 6897! 10927! SELANGOR: Kwala Lumpar, Curtis 2402! JOHORE: Ridley!

8. *ERYCIBE FESTIVA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A climber, 60 to 70 feet long (Kunstler), or a small tree (Hullett); branches grooved but cylindric; ultimate branchlets slightly angular, sparingly pubescent. *Leaves* elliptic or oblong, base cuneate, apex usually rather long acuminate with an obtuse tip; 3 to 6 in. long, 1.5 to 2.5 in. wide; glabrous; thinly coriaceous; lateral nerves 7 to 9 pairs, distinct on both surfaces, especially beneath, secondary venation distinct beneath; petiole glabrous, .5 to .75 in. long. *Flowers* in short axillary 7-12-flowered cymes .5 to .75 in. across; peduncles .3 to .5 in. long, rusty-pubescent; pedicels rusty-pubescent, bracteolate, .12 in. long. *Sepals* orbicular, rusty-pubescent. *Corolla* pale greenish-white within, .75 in. across, lobes broad; interlobular spaces brown-tomentose externally; lobules ovate, margins erose, usually rather deeply, through-

out. Prain Journ. As. Soc. Beng. LXV. 2. 536; Hallier f. Bull. Herb Boiss. V. 739.

**PEBAK**: in open forest in rocky localities, at 500 to 800 feet elevation, *King's Collector* 6445! SINGAPORE: garden jungle, *Ridley* 6043! *Hullett*!

9. *ERYCIBE SAPOTACEA*, Hallier f. & Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A tree (?); branches slightly angled, with fissured bark, quite glabrous. *Leaves* elliptic, base cuneate, apex abruptly shortly acuminate with tip obtuse; 5 in. long, 2 to 2.25 in. wide; firmly coriaceous; quite glabrous on both sides; bright green and glossy above, pale beneath; lateral nerves 6 pairs, distinct above and rather prominent beneath, secondary reticulate venation very distinct on both surfaces; petiole .5 in. long, glabrous. *Flowers* in few-flowered congested, axillary subsessile cymes. *Sepals* and *Corolla* not seen. *Fruit* ovoid, quite glabrous, the epicarp very coriaceous, almost woody, wrinkled and fissured, with a rounded base and conical pointed apex, 2 in. long, 1 in. in diam.; fruiting pedicels .3 in. long, with epidermis fissured like that on the branches.

**PENANG**: Government Hill, *Curtis* 772!

A very distinct and striking species, the flowers of which are as yet unknown. In shape the fruit is most like that of *E. Griffithii*, but besides being about twice the size it has none of the scurfy covering of the fruit of that species. The leaves of the two are very different.

10. *ERYCIBE STAFFIANA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A shrubby or slender climber, sometimes 80 to 100 feet long; much branched; branches and glabrous branchlets cylindric. *Leaves* usually oblong or elliptic, rarely narrowly lanceolate, narrowed to a cuneate or narrowly truncate base, apex shortly acuminate with a blunt tip; 4 to 7 in. long, 2 to 3 in. wide; coriaceous; glabrous; dark green and glossy above, paler beneath; lateral nerves 4 to 6 pairs, ascending obliquely, the lowest pairs extending more than half-way along the margin, the secondary veins reticulately raised beneath, visible but not conspicuous above; petiole .25 in. long, glabrous. *Flowers* in clustered axillary cymes .5 to 2 in. long, in fascicles of 4 to 9 from a woody protuberance, each 5-20-flowered; peduncles densely dark-brown-tomentose, as are the bracteolate pedicels, .1 to .15 in. long. *Sepals* orbicular, densely brown-tomentose. *Corolla* waxy-white within, .5 in. across; lobes narrow; interlobular spaces very dark-brown-tomentose (nearly black—*Kunstler*) externally; lobules narrow, divergent, slightly crenulate along the obliquely truncate apex. *Fruit* ovoid, .6 to .8 in. long, .5 in. in diam., densely clothed with a fine dark-brown velvety tomentum. Hallier f. Bull. Herb. Boiss. V. 738.

PERAK: at various elevations from 800 to 4,000 feet, *King's Collector* 4015! 4115! 7784! *Wray* 3371! *Scortechini* 1793!—DISTRIB. Tenasserim (*Parish*).

11. *ERYCIBE PRÆCIPUA*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 86. A large climbing shrub; branches and ultimate branchlets cylindric, glabrous. *Leaves* narrowly elliptic to elliptic, narrowed to the cuneate base and more abruptly to the obtuse tip; thickly coriaceous; quite glabrous; 1.5 to 4 in. long, .75 to 2 in. wide; nerves about 5 pairs, curved and ascending, but all very obscure even when dry; petioles .3 in. long, glabrous. *Flowers* in small, axillary, laxly 5-8-flowered cymes .5 in. across; peduncles and bracteolate pedicels closely rusty-pubescent, pedicels .12 in. long. *Sepals* orbicular, the outer minutely, the inner densely closely rusty-pubescent. *Corolla* whitish, .5 in. wide, the lobes very narrow, spreading; interlobular spaces rufous-pubescent internally as well as externally; lobules small glabrous, narrowly oblong, sub-acute, divergent. *Fruit* ovoid, slightly rough but not verrucose, .7 to .75 in. long, .5 to .6 in. wide, pointed or rounded.

PENANG: Government Hill, *Curtis* 911! 1273! PERAK: Larut, *Scortechini*!

Father *Scortechini's* specimens from Perak have the fruit slightly smaller, not at all pointed, and not so distinctly roughened as the Penang specimens, but in all other respects the two plants agree.

12. *ERYCIBE GLOMERATA*, *Bl. Bijdr.* 1047. A shrub or a small tree, 10 to 20 feet high, erect, much spreading; branches and sparingly pubescent ultimate branchlets cylindric. *Leaves* elliptic or narrow-oblong, shortly or gradually narrowed to the cuneate base and to the obtuse tip; 7 to 12 in. long, 1.75 to 5 in. wide; coriaceous, quite glabrous; dark green above, waxy-pale greenish-yellow (*Kunstler*) beneath; lateral nerves 8 to 9 pairs, visible but not raised on either surface or only faintly raised beneath; petiole .15 to .35 in. long. *Flowers* in axillary very short and closely glomerate 5-8-flowered cymes; peduncles .05 in. long; individual flowers nearly sessile with 8 rusty-pubescent bracteoles at the base of the calyx. *Sepals* almost glabrous, pale waxy-green (*Kunstler*), orbicular, margins ciliate. *Corolla* pure white within, 1.25 in. across; lobes narrow; interlobular spaces rufous externally, lobules oblong, obtuse, slightly crenulate at the apex. *Hallier f. Bull. Herb. Boiss.* V. 382, 739. *E. alba*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 87.

*VAR. typica*; leaves elliptic, 3.5 to 5 in. wide.

PERAK: on Gunong Bubu, 2,500 to 3,000 feet, *King's Collector* 7373! Larut, *Scortechini*! PUNGAH: *Curtis* 2947!—DISTRIB. Java.

*VAR. longifolia*, Bl. Bijdr. 1047; leaves cuneate-oblong, obtusely acuminate, 1·75 to 2·25 in. wide. *E. angustifolia*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Waterfall Hill, Wray 2580! MALACCA: Bujong, *Scortechini* 1908!—DISTRIB. Java, Borneo.

13. *ERYCIBE AENEA*, Prain Journ. As. Soc. Beng. LXIII. 2. 85. A very large climber; stems 70 to 150 feet long, 3 to 4 in. in diam.; branches and densely rusty-tomentose branchlets cylindric. Leaves narrowly oblong or elliptic, base cuneate, apex gradually or oftener abruptly narrowed to an obtuse tip; thickly coriaceous; quite glabrous; 2·5 to 5 in. long, 1 to 2 in. wide; lateral nerves 5 to 6 pairs with a distinct sub-marginal connecting nerve, impressed on both surfaces but especially beneath; petiole ·25 in. or less. Flowers in axillary 3–20-flowered cymes ·25 to 1·2 in. long; peduncles and bracteolate pedicels minutely closely rusty-tomentose; pedicels ·12 in. long. Sepals orbicular, closely brown-tomentose. Corolla pale yellow, ·5 in. across, the lobes spreading; interlobular spaces pale brown-tomentose externally; lobules ovate-oblong, their margins undulate. Fruit elliptic, verrucose, grey, ·9 in. long, ·5 to ·6 in. wide. Hallier f. Bull. Hort. Boiss. V. 739.

PERAK: Larut, at elevations of from 300 to 2,500 feet, *King's Collector* 7337! 8165!

14. *ERYCIBE GRIFFITHII*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A climber 60 to 80 feet long, stem 4 to 6 in. in diam.; branches cylindric, glabrous, branchlets cylindric, sparingly rusty-pubescent. Leaves elliptic, rarely ovate-lanceolate or obovate-oblong, base cuneate or rarely rounded, apex usually abruptly acuminate, less often gradually narrowed to the obtuse tip; 2·75 to 6 in. long, ·75 to 2·5 in. wide; quite glabrous on both surfaces, sub-coriaceous; lateral nerves 6 to 8 pairs, very oblique, visible but not prominent above, prominent beneath; secondary venation very indistinct; petiole ·25 to ·3 in. long, glabrous. Flowers in short axillary solitary or clustered 4–9-flowered cymes ·3 in. across; peduncles rusty-pubescent, ·2 to ·3 in. long; pedicels ·25 in. long, rusty-pubescent as are the very minute ovate-lanceolate bracteoles. Sepals orbicular, rusty-pubescent externally. Corolla waxy cream-coloured and glabrous within, ·5 in. across, the lobes spreading, narrow and stellate; interlobular spaces rusty-brown externally; lobules narrow acute, their margins sub-entire. Fruit coriaceous, greyish-brown and closely scurfy externally, 1 to 1·5 in. long, ·5 to ·75 in. wide. Prain Journ. As. Soc. Beng. LXIII. 85, Hallier f. Verslag. Buitenzorg, 1895. 126; Bull. Herb. Boiss. V. 738, 1052. *E. Mangayi*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182; Hallier f. Bull. Herb. Boiss. V. 737. *E. micrantha*, Hallier f. Engl. Bot. Jahrb. XVI. 524.



PERAK: Larut, 200 to 300 feet elevation, *King's Collector* 8191! *Scortechini*! MALACCA: Maingay. PENANG: *Gaudichaud* 120; *Curtis*, 181! *King's Collector* 1458!—DISTRIB. Tenasserim, Sumatra, Philippines.

### 3. POBANA, Burm.

Large climbers. *Leaves* petioled, ovate or cordate, entire. *Flowers* small; cymes often in large panicles; bracts persistent; bracteoles subulate or 0. *Sepals* 5, small and narrow in flower; in fruit the outer 3 or all 5 much accrescent, membranous and spreading, usually spatulate. *Corolla* white, campanulate or infundibuliform with a wide or narrow throat; limb spreading plicate, sub-entire or 5-lobed. *Stamens* 5, adnate to corolla-tube, sub-included; filaments linear or filiform. *Ovary* 2-celled or 1-celled; ovules 4 or 2; style long or short, entire or 2-fid; stigma solitary 2-lobed, or stigmas 2, capitate. *Fruit* globose oblong or obconic, 1-seeded, membranous, indehiscent or opening by 2 valves. *Seed* glabrous; cotyledons plicate.—DISTRIB. Species about 10, throughout S.E. Asia.

POBANA VOLUBILIS, Burm. Fl. Ind. 51. t. 21. f. 1. A large climber; stems and warted branches glabrous, young shoots pubescent. *Leaves* glabrous, ovate sub-cordate, or sometimes base rounded, apex shortly acuminate, quite glabrous, 2.5 in. long, 1.5 in. wide; petiole .6 in. long. *Flowers* white, small, in sub-ebracteate cymes disposed in panicles 12 to 15 in. long, minutely tawny-pubescent; pedicels .1 to .25 in. long. *Sepals* 5, minutely pubescent, in flower .2 in. long, oblong; in fruit .35 in. long, sub-spatulate, all equal. *Corolla* .3 in. long; tube narrow; limb rather distinctly 5-lobed. *Stamens* 5, included. *Ovary* 2-celled; ovules 4; style 2-partite; stigmas small, capitate. *Fruit* a globose capsule, enclosed in the accrescent 5-7-nerved calyx-lobes, .15 in. in diam. *Seed* solitary. Lamk Ill. t. 186, Roxb. Fl. Ind. ed. Carey & Wall. II. 40; ed. orig. I. 465; Blume Bijdr. 723, Wall Cat. 1327; Choisy Convolv. Or. 106, and in DC. Prod. IX. 436; Clarke in Hook. f. Flor. Brit. Ind. IV. 222.

MALACCA: *Griffith*! *King*!—DISTRIB. Indo-China, Malay Archipelago.

*King's* examples are from a cultivated plant, whether those of *Griffith* be from wild plants is unknown.

### 4. NEUROPELTIS, Wall.

Large scandent, tomentose shrubs. *Leaves* ovate or oblong, firm, petioled. *Flowers* many, small, in axillary racemes or terminal panicles; pedicels distinct, beset by solitary ovate-lanceolate bracteoles under the calyx, in flower inconspicuous, in fruit greatly accrescent.

*Sepals* 5, sub-orbicular, hardly altered in fruit. *Corolla* small, white; tube wide-campanulate; limb deeply 5-lobed, the lobes induplicate-valvate in bud. *Stamens* 5, exserted or included, adnate to corolla-tube; filaments filiform. *Ovary* imperfectly or perfectly 2-celled; ovules 4; styles 2, free throughout, stigmas sub-capitate wavy or obscurely lobed. *Fruit* a globose, 4-valved, 1-seeded capsule sessile near the centre of the flat, much-acrescent bracteole. *Seed* globose, glabrous, albuminous; cotyledons plicate.—DISTRIB. Species 2, in tropics of Eastern Hemisphere.

*NEUROPELTIS RACEMOSA*, Wall. Cat. 1322. A robust climber; branchlets pubescent, lenticellate, rather dark. *Leaves* alternate, elliptic-lanceolate, base cuneate, apex acuminate with a narrow longish thickened mucro; lamina 2.5 to 5 in. long, 1.25 to 2.25 in. wide; firmly papery; glabrous except along the midrib above, slightly rusty with a sub-persistent pubescence beneath; lateral nerves about 7-paired, somewhat curved forward, rather prominent and pubescent beneath. *Flowers* in axillary racemes 2 to 5 in. long, peduncle .5 to 1 in. and rachis rusty-tomentose; bracts small ovate; pedicels .12 to .2 in. long, tomentose, slender, with an ovate-lanceolate bracteole under the calyx. *Sepals* 5, somewhat connate below, small, orbicular, rufous-villous. *Corolla* small, campanulate, white, tube rufous-villous externally; limb .25 to .3 in. across, 5-lobed, lobes ovate nearly as long as the tube. *Stamens* 5, adnate to corolla-tube, exserted; filaments thickened at base. *Ovary* imperfectly or perfectly 2-celled, rufous-villous at base; ovules 2 in each cell; styles 2, glabrous; stigmas large globose wavy. *Capsule* .25 in. long, ovoid, glabrescent, sessile in the centre of the accrescent, orbicular, scarious, reticulate bract 1 to 1.75 in. wide with rounded or cordate base. *Seed* globose, glabrous, albuminous; cotyledons plicate. Roxb. Flor. Ind. ed. Carey & Wall. II. 44; Deless. Ic. Select. V. t. 96; Choisy Convolv. Or. 109, t. 2, f. 12, and in DC. Prod. IX. 437; Bedd. Ic. Pl. Ind. Or. t. 291; Kurz For. Flor. Burm. II. 222; Clarke in Hook f. Flor. Brit. Ind. IV. 225. *N. ovata*, Wall. Cat. 1323; Choisy Convolv. Or. 110, t. 2, f. 13, and in DC. Prod. IX. 437. *N. bracteata*, Griff. Notul. IV. 285. *N. intermedia*, Griff. Notul. IV. 285.

PEBAK: Larut, *Scortechini* 1483! 1489! 2071! *King's Collector* 3544! 3792! 4370! 6809! PENANG: *Wallich*! MALACCA: *Mangay* 1152! 1153! SINGAPORE: *Wallich*!—DISTRIB. Malabar, Borneo.

### 5. EVOLVULUS, Linn.

Small prostrate or erect herbs or undershrubs, never climbing. *Leaves* small, entire, often distichous. *Flowers* small, blueish or white,

in axillary few-flowered peduncled or sub-sessile cymes. *Sepals* 5, small, sub-equal, not enlarged in fruit. *Corolla* small, funnel-shaped or sub-rotate; limb plicate, sub-entire. *Stamens* 5, included or exerted; filaments filiform. *Ovary* 2-celled or, rarely, 1-celled; ovules 4; styles 2, free from the base, each cleft into 2 linear or sub-clavate stigmas, papillose on the inner face. *Fruit* a 4-valved, less often a 2-valved capsule, 2-celled or 1-celled. *Seeds* 4 or 2, rarely solitary, glabrous; cotyledons twice plicate.—**DISTRIB.** Species about 80, mostly tropical American; the present the only Asiatic.

**EVOLVULUS ALSINOIDES**, Linn. Sp. Pl. ed. II. 392. A small perennial herb; annual branches numerous, wiry, often prostrate. *Leaves* variable in shape from lanceolate to ovate, and in pubescence from sparingly silky to densely tawny or rufous-tomentose; .25 to 1 in. or occasionally 1.5 in. long, .2 to .5 in. wide; petiole absent or short, rarely .2 in. long. *Flowers* 1 to 3, on peduncles .1 in. to 1 or 1.5 in. long; bracts small, linear, hirsute, persistent; pedicels .05 to .5 in. long. *Sepals* 5, lanceolate, hirsute, .1 to .15 in. long. *Corolla* pale blue or white, transparent, .25 to .3 in. long. *Capsule* globose, .15 in. in diam., 4-valved. *Seeds* 4, glabrous. Burm. Fl. Zeyl. 9, t. 6, f. 1; Wall. Cat. 1317; Roxb. Flor. Ind. II. 105; Choisy in DC. Prod. IX. 447; Clarke in Hook. f. Flor. Brit. Ind. IV. 220. *E. unifolius*, Linn. Sp. Pl. ed. II. 392; Choisy in DC. Prod. IX. 449. *E. angustifolius*, Roxb. Flor. Ind. ed. Carey & Wall. II. 107. *E. hirsutus*, Lamk. Encyc. Meth. III. 588; Ill. t. 216, f. 2; Choisy in DC. Prod. IX. 447, excl. syn. Roxb. *E. sericeus*, Wall. Cat. 1315. *Convolvulus valerianoides*, Blanco Fl. Filip. 90.

**NICOBARS:** Kamorta, Kurz! **SINGAPORE:** Changi, Ridley!—**DISTRIB.** Cosmopolitan in the tropics.

The form recorded from the Nicobars and Singapore is the narrow-leaved form, which is *E. unifolius* Linn. In both localities it is probably an introduced weed.

## 6. BONAMIA, Thouars.

Large climbing shrubs. *Leaves* large ovate-cordate, entire, firm. *Flowers* medium, in axillary peduncled cymes, bracts small. *Sepals* 5, sub-equal, firm, ovate. *Corolla* infundibuliform, tube hirsute externally except opposite the sepals; limb 5-lobed, plicate. *Stamens*, 5, included, adnate to corolla-tube; filaments filiform, at least in upper part. *Ovary* 2-celled, ovules 4; style 2-fid to the middle; stigmas 2, capitate. *Fruit* a globose or ovoid capsule; valves thin, splitting irregularly at their apices. *Seeds* normally 4, glabrous or nearly so.—**DISTRIB.** Species about 30, throughout the tropics.

**BONAMIA SEMIDIGYNA**, Hallier f. Engl. Bot. Jahrb. XVI. 528. A large twining shrub; stems and leaves rusty-tomentose. *Leaves* ovate-cordate, entire, apex acute; length 4 in., width 2·5 in.; petiole 1·5 in. long. *Flowers* medium, in axillary sub-capitate 2-5-flowered cymes; peduncles 1 to 2 in. long, rusty-villous as are the pedicels and sepals; bracts ·25 in. long, oblong, rusty-villous. *Sepals* ·35 to ·5 in. long, ovate-oblong, sub-acute, sub-equal. *Corolla* yellowish, wide-infundibuliform, 1·5 in. long, tube hirsute externally; limb sub-entire. *Style* ·6 in. long. *Capsule* sub-globose, glabrous, ·5 in. in diam., splitting into many vertical segments, hardly covered by the slightly accrescent, ovate fruiting sepals. *Seeds* sub-glabrous. Bull. Herb Boiss. V. 1814. *Convolvulus semidigynus*, Roxb. Hort. Beng. 13, Flor. Ind. I. 468; Wall. Cat. 1405. *Breweria cordata*, Bl. Bijdr. 722, Choisy in DC. Prod. IX. 438; Clarke in Hook. f. Flor. Brit. Ind. IV. 223. *B. Roxburghii*, Choisy Convolv. Or. III., and in DC. Prod. IX. 438; Wight, Ic. t. 1370; Dalz & Gibs. Bomb. Fl. 162. *B. madagascariensis*, Choisy Mem. Soc. Phys. Genev. 493.

PROV. WELLESLEY: at Kubang Ulu, *Curtis*! PENANG: on the coast, *Porter*! *Curtis* 1703! PERAK: Ipoh, *Curtis* 3166!—DISTRIB. S.E. Asia generally, Mascarenes.

#### 7. CALYSTEGIA, R. Br.

Prostrate or twining perennial herbs. *Leaves* entire or lobed, glabrous or nearly so. *Flowers* medium, axillary solitary or rarely in few-flowered cymes; bracts 2, large, leafy, embracing the calyx, persistent. *Sepals* 5, ovate or oblong, the innermost 2 rather the smallest. *Corolla* funnel-shaped or campanulate; tube glabrous externally with 5 bands in centre of component petals, each with 5 pellucid lines at the base; limb sub-entire plicate. *Stamens* 5, adnate to corolla-tube, included; filaments sub-equal. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform, entire; stigma of 2 oblong lobes. *Fruit* a globose, 1-celled, 4-valved, 4-seeded capsule. *Seeds* black, glabrous or verrucose.—DISTRIB. Species 16 to 20, in warm and temperate regions.

**CALYSTEGIA HEDERACEA** Wall. Cat 1328. A prostrate or climbing weed of cultivated places and hedges. *Leaves* somewhat irregular, cordate or sagittate, lobed or rarely entire, 1 to 3 in. long, ·75 to 1 in. wide; petiole 1 in. long. *Flowers* axillary solitary; peduncles 1 in. long; bracts 2 ovate, ·3 in. across, persistent, enclosing the calyx. *Sepals* 5, oblong, obtuse, glabrous, outer ·3 in. long, inner rather smaller. *Corolla* sub-campanulate, pinkish purple, tube 1 in. long; limb plicate, sub-entire. *Capsule* ovoid, sub-acute, glabrous, ·3 in. long.

*Seeds* glabrous. Roxb. Flor. Ind. ed. Carey & Wall. II. 94; Choisy Convolv. Or. 103, and in DC. Prod. IX. 434; Clarke in Hook. f. Flor. Brit. Ind. IV. 217. *Convolvulus Wallichianus*, Spreng. Syst. cur. post. 61.

PENANG: Porter, fide Wallich.—DISTRIB. Northern India, Afghanistan, Eastern Asia.

Possibly only a casual weed in our area.

#### 8. HEWITTIA, W. & A

A pubescent twining herb. *Leaves* cordate, entire angled or lobed. *Flowers* axillary solitary, or in few-flowered cymes; bracts below the calyx 2, linear-lanceolate. *Sepals* 5, acute; outer 3 wide-ovate, accrescent in fruit, inner 2 narrow-lanceolate. *Corolla* medium, yellow or white with a purple eye; tube campanulate; limb plicate. *Stamens* 5, included, adnate to corolla-tube; filaments linear with dilated bases. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform; stigma of 2 ovate-oblong lobes. *Fruit* a globose, 4-valved, 1-celled, normally 4-seeded capsule. *Seeds* black, glabrous.—DISTRIB. A single species, throughout the tropics of the Eastern Hemisphere and Polynesia.

HEWITTIA BICOLOR, Wight Ic. t. 835. A pubescent perennial herb; stems twining. *Leaves* cordate, entire angled or lobed, pubescent, 2 to 4 in. long; petiole .5 in. long. *Flowers* on axillary 1-few-flowered peduncles .5 to 4 in. long; bracts 2, narrow-lanceolate, .25 to .5 in. long, situated a short distance below the calyx. *Sepals* 5, the outer ovate, accrescent; the inner narrowly lanceolate, .3 to .5 in. long. *Corolla* yellow or whitish with a purple patch in lower part of tube, rather widely campanulate, 1 in. long; tube externally hirsute; lobes 5, very short. *Stamens* 5, included; filaments linear with dilated bases. *Ovary* hirsute, more or less perfectly 2-celled; ovules 4; style filiform; stigmas 2, ovate-oblong. *Fruit* a globose capsule, .25 in. in diam., 1-celled, opening by 4 valves. *Seeds* 4, black, glabrous. Wight Ill. t. 168; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus bicolor*, Vahl. Symb. III. 25; Bot. Mag. t. 2205; Roxb. Hort. Beng. 14; Flor. Ind. I. 475; Flor. Ind. ed. Carey & Wall. II. 57; Wall. Cat. 1410. *C. bracteatus*, Vahl Symb. III. 25. *C. involucreatus*, Ker in Bot. Reg. t. 318 (not of Spreng.). *Iponoea bicolor*, Sweet Hort. Brit. ed. 2, 372. *I. bracteata*, Bl. Bijdr. 711 (not of Willd. nor of Wight). *I. Weinmanni* Roem. & Schult. Syst. Nat. IV. 243. *Calystegia Keriana*, Sweet Hort. Brit. ed. 2, 370. *Palmia bicolor*, Endl. ex Dalz. & Gibs. Bomb. Flor. 163. *Shutera bicolor*, Choisy Convolv. Or. 104, and in DC. Prod. IX. 435; Flor. des Serres t. 421. *Aniseia Afzelii*, G. Don Gen. Syst. IV. 295. *A. bracteata*, Hassk. Pl. Jav. Rar. 516.

PERAK : Larut, *Scortechini* !—DISTRIB. Tropical Africa, S.E. Asia generally, Polynesia.

### 9. ANISEIA, Choisy.

Twining herbs. *Leaves* elliptic, mucronulate or lanceolate. *Flowers* axillary, solitary or in few-flowered cymes. *Sepals* 5, herbaceous, acuminate; outer 3 the larger, ovate, decurrent on the peduncle and accrescent in fruit; inner 2 smaller, lanceolate, unaltered in fruit. *Corolla* wide-infundibuliform; tube hirsute externally except on spaces opposite the sepals, with 5 distinct vertical bands; limb sub-entire. *Stamens* 5, adnate to corolla-tube, included; filaments filiform. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigma 2-globosc. *Fruit* a 2-celled, 4-valved capsule. *Seeds* 4, large, black, smooth.—DISTRIB. Species about 5, all confined to America but one, which is cosmopolitan in the tropics

ANISEIA MARTINICENSIS, Choisy Convolv. Rar. 144. A slender herb creeping in wet places or climbing, glabrous or with a few adpressed hairs. *Leaves* oblong-lanceolate, apex obtuse with a mucro, base cuneate; glabrescent; .75 to 3 in. long, .5 to 1 in. wide; petiole .6 in. long. *Flowers* axillary solitary; peduncles 1 in. long, with 2 minute, persistent bracts about the middle. *Sepals* unequal, the outer ovate-acute .6 in. long, the inner narrower, green, glabrescent; in fruit accrescent at length .75 to 1 in. long, the 2 outer then sub-cordate-ovate scarious, strongly nerved, decurrent on the peduncle; the inner lanceolate. *Corolla* white, campanulate, tube 1 in. long, pubescent outside; limb 1 in. across. *Capsule* ovoid, glabrous, .5 in. long. *Seeds* with minutely strigose margins. Choisy in DC. Prod. IX. 430; Hallier f. Engl. Bot. Jahrb. XVIII 96, and Bull. Herb Boiss. V. 382. *A. uniflora*, Choisy Convolv. Or. 101, t. 2, f. 9, and in DC. Prod. IX. 431; Wight Ic. t. 850. *Convolvulus martinicensis*, Jacq. Am. 20, t. 17. *C. uniflorus*, Lamk Encyc. Meth. III. 544; Burm. Fl. Ind. 47, t. 21. *C. emarginatus*, Vahl Symb. III. 23. *C. Rheedei*, Wall. Cat. 1358; Roxb. Flor. Ind. ed. Carey & Wall. II. 70. *Ipomœa martinicensis*, Mez Prim. Fl. Esseq. 98. *I. uniflora*, Roem. & Schult. Symb. IV. 247; Clarke in Hook. f. Flor. Brit. Ind. IV. 201. *I. lanceolata*, G. Don Gen. Syst. IV. 282.

PERAK : Kwala Dipong, *Scortechini* 1780! Kota Bahru, *King's Collector* 1075! MALACCA : *Griffith* !—DISTRIB. Tropics generally.

### 10 JACQUEMONTIA, Choisy.

Climbing or twining herbs or undershrubs; stems and leaves usually pubescent. *Leaves* usually cordate or elliptic, entire or rarely toothed or lobed. *Flowers* axillary, in compound umbellate or capitate

cymes, very rarely solitary; bracts small, rarely leafy. *Sepals* 5, equal or unequal. *Corolla* usually small; tube infundibuliform with a wide or narrow throat, and with 5 vertical bands each ending in 2 distinct nerves; limb plicate. *Stamens* 5, adnate to corolla-tube, included. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigmas 2, linear or elliptic-oblong. *Fruit* a globose 2-celled capsule, usually 8-valved, rarely 4-valved. *Seeds* normally 4, usually glabrous, often slightly winged along the margins.—**DISTRIB.** Species 60 to 70, mostly in Brazil; 2 to 3 in S.E. Asia.

*JACQUEMONTIA PANICULATA*, Hallier f. Engl. Bot. Jahrb. XVI. 541; XVIII. 95. A slender climber; stems twining, puberulous. *Leaves* ovate-cordate, acute, entire, pubescent beneath, puberulous at length; glabrescent above, 1.5 to 3 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* axillary, in small dense many-flowered sub-capitate cymes; peduncles puberulous, 1 to 1.5 in. long; bracts inconspicuous. *Sepals* 5, ovate-cordate, pubescent, .25 in. long, not altered in fruit. *Corolla* tubular, .5 in. long; mouth narrow, limb pink or white, shortly acutely 5-lobed. *Capsule* globose, glabrous, 2 in. in diam. *Seeds* glabrous. *Convolvulus parviflorus*, Vahl. Symb. III. 29; Roxb. Flor. Ind. ed. Carey & Wall. II. 51; Choisy Convolv. Or. 98, and in DC. Prod. IX. 413; Clarke in Hook. f. Flor. Brit. Ind. IV. 220. *C. asclepradeus*, Wall. Cat. 1396. *Ipomœa paniculata*, Burm. Flor. Ind. 50, t. 21, f. 3. *I. parviflora*, Pers. Synops. I. 183 (not of Vahl.)

**PERAK.** Kampong Kota, Wray 3337!—**DISTRIB.** Tropical Africa, S.E. Asia generally, Australia.

# 11. MERREMIA, Dennst.

Shrubs or herbs, usually climbing, rarely erect or prostrate; stems very rarely winged. *Leaves* entire, lobed, or divided. *Flowers* axillary, usually long-peduncled, solitary or in few-flowered, rarely many-flowered cymes, bracts small. *Sepals* 5, sub-equal, elliptic or lanceolate, acuminate, rarely rounded or truncate, convex, usually slightly accrescent in fruit. *Corolla* campanulate, white, less often yellow or orange, the tube with 5 vertical bands each usually marked by 5 dark-violet lines, limb plicate, margin slightly 5-lobed. *Stamens* 5, unequal, included or exerted; filaments filiform; anthers usually twisted; pollen never spinulose. *Ovary* 2-celled or occasionally 4-celled, ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule, 1-4-locular, sometimes the style separating with a small stopple. *Seeds* 4, rarely fewer, dull, glabrous, rarely puberulous.—**DISTRIB.** Species about 40, in all warm countries.

Corolla glabrous externally:—

Leaves not peltate:—

Leaves deeply 5-lobed; flowers large .. .. 1. *M. vitifolia*.

Leaves entire or very slightly lobed; flowers small —

Sepals acuminate; flowers yellow with a pink or purple eye:—

Leaves acute at apex .. .. 2. *M. hastata*.

Leaves obtuse, truncate, or 3-toothed at apex .. .. 3. *M. tridentata*.

Sepals obtuse: flowers without a distinct eye:—

Leaves narrow-oblong, the lower often ovate-oblong; flowers white with pinkish tinge or yellowish-white or pale yellow .. .. 4. *M. caespitosa*.

Leaves ovate-cordate, margin often crenate or toothed; flowers clear yellow .. .. 5. *M. convolvulacea*.

Leaves peltate; flowers large .. .. 6. *M. nymphaeifolia*.

Corolla somewhat hirsute or shaggy externally.—

Leaves more or less hirsute; flowers in compact corymbose or umbellate cymes .. .. 7. *M. umbellata*.

Leaves quite glabrous; flowers in lax cymes .. .. 8. *M. crispata*.

1. *MERREMIA VITIFOLIA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A large climber with slender hispidly hairy branches. *Leaves* cordate, palmately 5-lobed, 2 to 6 in. across, lobes triangular acute, often toothed or again acutely lobed; petiole .5 to 2 in. long, hispidly hairy. *Flowers* in axillary 1-7-flowered cymes; peduncles hispidly hairy, 1 to 4 in. long, pedicels hispidly hairy, .2 to .5 in. long. *Sepals* ovate-acute, hispid, .5 in. long, in fruit somewhat enlarged, .75 in. long. *Corolla* campanulate, clear yellow, glabrous, 1.5 in. long and nearly as wide, slightly irregular. *Capsule* depressed-globose, membranous, 2-celled, normally 4-seeded. *Seeds* glabrous. Verslag. Buitenzorg, 1895, 127, and Bull. Herb. Boiss. V. 379. *Convolvulus vitifolius*, Burm. Fl. Ind. 45, t. 18, f. 1; Linn. Mantiss. 203; Roxb. Hort. Beng. 14, Flor. Ind. I. 476, and ed Carey & Wall. II. 61; Wall. Cat. 1348. *C. angularis*, Burm. Fl. Ind. 46, t. 19, f. 2; Linn. Mantiss. 203; Hassk. Pl. Jav. Rar. 519. *Ipomœa vitifolia*, Sweet Hort. Brit. ed. II. 372, Blume Bijdr. 709; Choisy Convolv. Or 72, and in DC. Prod. IX. 361, Kurz For. Flor. Burm. II. 219; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. angularis*, Choisy Convolv. Or. 72

PERAK: Larut, *Scortechini*! ANDAMANS: Port Mouat, *Kurz*! Narcondam, *Prairie*! NICOBARS Nancowry, *Prairie*! Collector!—DISTRIB. S.E. Asia generally.

2. *MERREMIA HASTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse twining biennial herb, stem angular. *Leaves* glabrous, hastate-lanceolate, 2 to 3 in. long, .3 to .5 in. wide, apex acute; petiole very short. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves; bracts very small, lanceolate. *Sepals* narrow,



acuminate, .3 to .5 in. long, glabrous. *Corolla* funnel-shaped, .6 in. long, pale yellow with a purple eye; limb slightly lobed. *Stamens* 5; filaments slightly hairy at the base; anthers straight. *Ovary* and style glabrous; ovary 2-celled, each cell 2-ovuled. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 117. *Convolvulus hastatus*, Desr. in Lamk Encyc. Meth. III. 547. *C. filicaulis*, Vahl Symb. III. 24. *C. denticulatus*, Spreng. Syst. I. 603. *C. medrus*, Roxb. Flor. Ind. I. 474, and ed. Carey & Wall. II. 56; Wall. Cat. 1346 (not of Linn.). *C. Blumei*, Dietr. Syn. Pl. I. 675. *Ipomœa denticulata*, R. Br. Prod. I. 485; Bot. Beg. t. 317 (not of Choisy). *I. filicaulis*, Bl. Bijdr. 721; Choisy Convolv. Or. 66; DC. Prod. IX. 353. *I. Blumei*, Steud. Nomencl. I. 815. *I. angustifolia*, Clarke in Hook. f. Flor. Brit. Ind. IV. 205 (not of Jacq., nor of Choisy). Rheede Hort. Malab. XI. t. 55.

PERAK: Larut, *Scortechini* 138! 1833! Kwala, &c., *Wray* 859! 1751! Sungah Ryah, *King's Collector* 996! PENANG: Batu Gaja, &c., *Deschamps*! MALACCA: *Griffith*! Tanjong Kling and Bukit Bruang, *Hervey*! PAHANG: Pekan, *Ridley*! Katapang, *Ridley* 1236! SINGAPORE: *Hullett* 69! 232! *King's Collector* 1174! *King*!—DISTRIB. Throughout S.E. Asia, Tropical Africa, and Australia.

3. *MERREMIA TRIDENTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse glabrous herb with a woody rootstock giving off many closely decumbent elongated stems. *Leaves* glabrous, hastate-oblong, or spatulate-linear, or sub-quadrata, .5 to .8 in. long, .15 to .5 in. wide, apex obtuse truncate or 3-toothed; petiole 0. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves; bracts very small, lanceolate. *Sepals* ovate, acuminate, .25 to .35 in. long. *Corolla* funnel-shaped, .4 to .5 in. long, yellow with pink eye; limb slightly lobed. *Stamens* 5. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 116. *Convolvulus tridentatus*, Linn. Sp. Pl. 157; Roxb. Fl. Ind. I. 475, and ed. Carey & Wall. II. 56, Wall. Cat. 1347. *Evolvulus tridentatus*, Linn. Sp. Pl. ed. II. 392. *Ipomœa tridentata*, Roth Cat. Bot. II. 19; Choisy Convolv. Or. 65, and in DC. Prod. IX. 353; Clarke in Hook. f. Flor. Brit. Ind. IV. 205.

MALACCA: *Griffith* 5861/1 (K.D.)! *Maingay* 1147 (K.D.)! JOHORE: Batu Pahat, *Ridley* 11,114!—DISTRIB. India generally, Africa, Bangka.

4. *MERREMIA CESPITOSA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A sparsely hairy or glabrescent annual or biennial slender twining or creeping herb. *Leaves* narrowly oblong, the lower often sub-cordate and ovate-oblong, sometimes slightly hastately lobed, 1.5 to 2.5 in. long, .5 in. wide; petiole .25 to .5 in. long. *Flowers* cymose, few or many on slender peduncles 1 to 3 in. long; bracts minute, persistent. *Sepals* elliptic-obtuse, .25 in. long, margins when dry often inflexed above.

*Corolla* sub-campanulate, .75 in. long, white with a pinkish tinge or yellowish-white or yellow. *Ovary* 2-celled, each cell 2-ovuled. *Capsule* ovoid, .25 in. long, papery, 1-celled, with only a trace of the original dissepiment near the base. *Seeds* glabrous. Bull. Herb. Boiss. V. 382. *Convolvulus caespitosus*, Roxb. Hort. Beng 14, Flor. Ind. I. 483, and ed. Carey & Wall. II. 70; Wall. Cat. 1357. *C. Benthamii*, Wall. Cat. 1393. *Hewittia caespitosa*, Steud. Nomencl. Bot. ed. II. i. 757. *Skinneria caespitosa*, Choisy Convolv. Or. 105, t. 6, and in DC. Prod. IV. 435. *Ipomœa linifolia*, Bl. Bijdr. 721; Choisy DC. Prod. IX. 369; Benth. Fl. Austr. IV. 423; Clarke in Hook. f. Flor. Brit. Ind. IV. 205. *I. setulosa*, Zoll. & Mor. Syst. Verzeichn. 51.

PERAK: Larut, *King's Collector* 2486! MALACCA: *Griffith!* SINGAPORE: *Kurz* 2976! *Hullett* 127! 387! *King!* *King's Collector* 1193!—DISTRIB. E. Himalaya, Indo-China, Malay Archipelago, Australia.

5. *MERREMIA CONVULVULACEA*, Dennst. Schl. Hort. Malab. 39. A much-twining glabrous or casually hirsute often muricated herb. *Leaves* ovate-cordate, acute, glabrous, margin usually crenate or toothed, sometimes 3-lobed, 1 to 2 in. long, .5 to 1 in. wide; petiole .5 to 2 in. long. *Flowers* numerous, rather densely cymose, on axillary peduncles .5 to 3 in. long; bracts small, caducous. *Sepals* elliptic, glabrous, .2 in. long, ultimately sub-patent, margins often at length sub-involute. *Corolla* funnel-shaped, externally glabrous, yellow, .5 to .6 in. long. *Capsule* ovoid, sub-angular, at the apex rather thicker than elsewhere and often depressed, .25 in. long; cells 2. *Seeds* puberulous. *M. hederacea*, Hallier f. Engl. Bot. Jahrb. XVIII. 168, and Verslag. Buitenzorg 1895, 126. *Evolvulus hederaceus*, Burm. Fl. Ind. 77, t. 30, f. 2. *Convolvulus flavus*, Willd. Sp. Pl. 852. *C. strictus*, Vahl Symb. III. 28. *C. dentatus*, Vahl Symb. III. 25; Roxb. Flor. Ind. ed. Carey & Wall. II. 62; Wall. Cat. 1349. *Ipomœa striata*, Poir in Lamk Encyc. Meth. Suppl. IV. 632 (not of Roth). *I. dentata*, Willd. ex Roem. & Schult. Syst. IV. 789. *I. subtriflora*, Zoll. & Mor. Verzeichn. 51.

PERAK: Durian, *King's Collector* 397! Larut, *Scortechini* 1832! PAHANG: Khol, *Ridley* 2168! JOHORE: Serom, *Ridley!* SINGAPORE *Dorward!*—DISTRIB. S.E. Asia, Africa, Australia.

6. *MERREMIA NYMPHÆIFOLIA*, Hallier f. Verslag. Buitenzorg, 1895, 127. A large woody climber. *Leaves* orbicular-ovate, shortly acuminate, entire, glabrous on both surfaces, peltate with a rounded or slightly retuse base, 6 to 10 in. long, 5 to 8 in. wide, the floral leaves more deeply cut and at times cordate with a narrow sinus. *Flowers* large, in loose 4-15-flowered cymes on a common peduncle sometimes shorter

than the petioles, sometimes longer than the leaves. *Sepals* broad, obtuse, coriaceous, nearly equal, in flower .75 in., in fruit nearly 1 in. long. *Corolla* wide-campanulate, 2 to 2.5 in. long, glabrous externally, yellow or white or purplish. *Stamens* 5; anthers hirsute. *Capsule* sub-globose, 1 in. in diam. *Seeds* pilose. *Ipomœa nymphaeifolia*, Bl. Bijdr. 719; Prain Journ. As. Soc. Beng. LXIII. 2, 107. *I. Rumphii*, Miq. Flor. Ind. Bat. II. 605. *I. peltata*, Choisy, Convolv. Or. 70, and in DC. Prod. IX. 359; Miq. Flor. Ind. Bat. II. 605; Benth. Flor. Austral. IV. 408; Bak. Flor. Maurit. 208. *Convolvulus peltatus*, Linn. Sp. Pl. 1194. *Spiranthera peltata*, Boj. Hort. Maurit. 226. *Operculina peltata*, Hallier f. Engl. Bot. Jahrb. XVI. 549; XVIII. 119. *Operculina lanosantha*, Nav. & Fernand. Vill. in Blanco Flor. Fil. ed. III. Pl. II. t. 261, f. 1.

PERAK: Pangkor, Scortechini 1074! Ridley 7158! DISTRIB. Mascarenes, S.E. Asia, Australia, Polynesia.

7. *MERREMIA UMBELLATA*, Hallier f. Eng. Bot. Jahrb. XVI. 552; VAR. *orientalis*, Verslag. Buitenzorg, 1895, 132, and Bull. Herb. Boiss. V. 381. A climbing softly hairy or almost glabrous shrub, stems often 15 to 20 feet long. *Leaves* cordate or hastate, elliptic or oblong, obtuse or shortly acute, entire or very rarely sinuate or angled, nerves rather distinct, softly hairy on both surfaces, or only beneath and glabrous except the nerves above, rarely quite glabrous above and only hairy on the nerves beneath, length 1.5 to 4 in., width 1 to 3 in.; petioles often softly hairy, .2 to .6 in. long. *Flowers* in compact corymbose cymes on axillary usually softly hairy peduncles .5 to 1 in. long; pedicels .2 to 1 in. long, bracts caducous. *Sepals* elliptic, obtuse, entire or mucronate, hairy or glabrous, .25 to .3 in. long. *Corolla* tubular-campanulate, white, or white with a yellow tinge, 1 to 1.5 in. long, lobes short, at first hirsute externally. *Capsule* globose, glabrous, .3 in. wide. *Seeds* patently hirsute with blackish hairs. *Convolvulus blandus*, Roxb. Hort. Beng. 13, Flor. Ind. I. 470, and ed. Carey & Wall. II. 50, 70; Wall. Cat. 1342. *C. cymosus*, Lamk Encycl. Meth. III. 556. *C. pentagonus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 72; Wall. Cat. 1343. *C. Rothii*, Spreng. Syst. I. 600. *Ipomœa cymosa*, Roem. & Schult. Syst. IV. 241; Blume Cat. Gewachs. Buitenz. 50; Choisy Convolv. Or. 79, and in DC. Prod. IX. 371; Bot. Reg. 1843, t. 24; Clarke in Hook. f. Flor. Brit. Ind. VI. 211. *I. bifida*, Roth Nov. Sp. 118. *I. Heyneri*, Roem. & Schult. Syst. IV. 237. *I. Rothii*, Roem. & Schult. Syst. IV. 241. *I. Olanda*, Sweet Hort. Brit. ed. II. 372. *I. caliginosa*, Choisy Convolv. Or. 79, and in DC. Prod. IX. 370.

PERAK: Taiping, Scortechini! Krian, Scortechini! Larut, King's Collector! PERANG: Wallach! King! Deschamps! SELANGOR:

*Ridley!* ANDAMANS: very common. NICOBARS: *Kurz!* Prain!—  
DISTRIB. E. and S.E. Asia, Tropical Africa.

VAR. *occidentalis*, Hallier f. Verslag. Buitenzorg 1895, 127. *Leaves* wide-cordate, softly hairy on both sides, 4 in. long, 3.5 in. wide; *cymes* umbellate; *corolla* yellow. *Convolvulus umbellatus*, Wall. Cat. 2329. *Ipomœa umbellata*, Mez Prim. Flor. Esseq. 99. *I. cymosa*, var. *culta*, Prain Journ. As. Soc. Beng. LXIII. 2, 108.

PERAK: Sungah Ryah, *Kunstler* 912!—DISTRIB. Bengal, naturalised; Tropical America.

8. *MERREMIA CRISPATULA*, Prain Beng. Pl. II. 730; VAR. *andamanica*, Prain. A large glabrous scandent herb. *Leaves* ovate-cordate, acuminate, margins entire or faintly undulate, glabrous on both surfaces, 3 to 4 in. long, 2.5 to 4 in. wide; petiole 1 to 1.5 in. long. *Flowers* in axillary few-flowered cymes, peduncles 1.5 to 2 in. long, pedicels .75 to 1.25 in. long, thickened upwards. *Sepals* orbicular, .5 in. long, in fruit .75 in. long. *Corolla* campanulate, limb hardly lobed, tube hirsute externally, yellow, 1.25 in. long. *Capsule* sub-orbicular, .75 in. across. *Seeds* minutely velvety, margins somewhat shaggy. *Ipomœa petaloidea*, var. *andamanica*, Prain Journ. As. Soc. Beng. LXIII. 2, 110.

ANDAMANS. S. Andaman, common.

This is in all probability specifically distinct from *Merremia crispatula* (*Ipomœa petaloidea*, Choisy), but it seems preferable to treat it for the moment as a variety of that species and not as a new species, because of its remarkable resemblance to *Merremia Riedeliana*, Hallier f. (*Ipomœa Riedeliana*, Oliv.), and *Merremia mammosa*, Hallier f. (*Ipomœa mammosa*, Choisy). From the former, as described and figured by Oliver, this differs in having a 4-celled ovary with 1 ovule in each cell, whereas *M. Riedeliana* has a 2-celled ovary with 4, sometimes 5, ovules in each cell. From *M. mammosa*, as figured by Rumphius, this differs in having obtuse calyx-lobes and a shaggy corolla; Rumphius' figure shows the sepals acute and the corolla glabrous. This plant appears to be the same thing as *Convolvulus platypeltis*, Span, from Timor, and if it proves to be distinct alike from *M. Riedeliana* and *M. mammosa*, which last is cited by Dr Hallier as an Andaman plant, though we have no authentic example of *M. mammosa* from the Andamans at Calcutta, the name it should bear will be *Merremia platypeltis*.

## 12. OPERCULINA, Manso.

Large herbaceous climbers; stems, peduncles and petioles usually winged. *Leaves* large, entire or lobed, rarely peltate. *Flowers* large, showy, axillary, solitary or often in few-flowered cymes. *Sepals* 5, large, ovoid, glabrous, accrescent in fruit and ultimately irregularly splitting from the tip. *Corolla* infundibuliform, rarely campanulate; tube with 5 vertical smooth bands. *Stamens* 5; filaments filiform; anthers large, at length contorted; pollen never spinulose. *Ovary* 2-celled, glabrous; ovules 4; style filiform; stigma 2-globose. *Fruit* a capsule, not

opening by valves; the epicarp circumscissile above the middle, the cap in separating carrying away the style; the endocarp at first entire, at length rupturing irregularly. *Seeds* usually solitary, rarely more than one, black, smooth or furred, usually large.—*DISTRIB.* Species 15, tropics generally.

Stems winged; bracts large, coloured; flowers white or pale yellow;	..	..	..	1. <i>O. Turpethum</i> .
leaves softly pubescent, not palmate	..	..	..	
Stems not winged; bracts small; flowers brilliant yellow; leaves	..	..	..	2. <i>O. tuberosa</i> .
glabrous, deeply palmately lobed	..	..	..	

1. *OPERCULINA TURPETHUM*, Manso En. Pl. Bras. 16, n. 49. A stout softly pubescent climber, with strong twining 4-angled ~~at~~ compressed less often sub-cylindric winged stems, wings membranous. *Leaves* large, ovate or oblong, obtuse or acute, 2 to 5 in. long, 1 to 3 in. wide, base cordate or truncate; petiole 1 in. long. *Flowers* axillary, in few-flowered cymes; peduncles 1 to 4 in. long; bracts oblong, 1 in. long, sometimes pinkish-purple, caducous. *Sepals* 5, ovate, softly pubescent, .5 in. long; in fruit accrescent orbicular, concave, scarious and fissile, 1 in. long. *Corolla* white or pale yellow, tubular-campanulate, 1.5 in. long. *Stamens* 5, included, anthers at length contorted. *Capsule* globose, .5 to .75 in. across. *Seeds* 4 or fewer, glabrous. Hallier f. Engl. Bot. Jahrb. XVIII. 120, and Verslag. Buitenzorg, 1895, 128. *Convolvulus Turpethum*, Linn. Sp. Pl. 155; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II 57, and Flor. Ind. I. 476; Wall. Cat. 1371; Bot. Mag. t. 2093; Hassk. Pl. Jav. Rar. 518. *C. anceps*, Linn. Mantiss. 43. *C. triquetra*, Vahl Symb. III. 30. *Ipomæa Turpethum*, R Br. Prod. I. 485; Bot. Reg. t. 279; Choisy Convolv. Or. 68, and in DC. Prod. IX. 360; Kurz For. Flor. Burm. II. 218, Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. anceps*, Roem. & Schult. Syst. IV. 231; Bl. Bijdr. 714; Choisy Convolv. Or. 68, and in DC. Prod. IX. 360. *I. triquetra*, Roem. & Schult. Syst. IV. 231. *Spiranthera Turpethum*, Boj. Hort. Maurit. 226. *Argyrea alulata*, Miq. Flor. Ind. Bat. II. 587.

ANDAMANS: Narcondam, *Prain*! NIOOBARS: Kamorta, *Kurz*! MALACCA: *Griffith*!—*DISTRIB.* E. Africa, S.E. Asia, Australia, Polynesia.

2. *OPERCULINA TUBEROSA*, Meissn in Mart. Fl. Bras. VII. 212. A stout glabrous climber with strong twining smooth or muricate stems. *Leaves* large, ovate, deeply palmately lobed; lobes elliptic-lanceolate, acuminate, entire, 3 to 5 in. across; petiole 2 to 5 in. long. *Flowers* axillary in many-flowered cymes; peduncles 2 to 6 in. long; bracts deciduous; pedicels .25 to 1 in. long. *Sepals* 5, elliptic-oblong, obtuse; accrescent in fruit and spreading, ultimately 2 in. long, 1 to 1.5 in. wide. *Corolla* yellow, tubular-campanulate, 2 in. long. *Stamens* 5, included,

anthers twisted. *Capsule* globose, .3 in. wide; peduncle somewhat thickened. *Seeds* furred along the angles. Hallier f., in Engl. Bot. Jahrb. XVI. 476, 549; XVIII. 119; Verslag. Buitenzorg 1895, 128, and Bull. Herb. Boiss. VII. 410. *Ipomœa tuberosa*, Linn. Sp. Pl. 160; Choisy in DC. Prod. IX. 362 (partly).

SINGAPORE: *Hullett* 645, in cultivation.—DISTRIB. America, Africa, India, Malaya, New Caledonia.

# LEPISTEMON, Bl.

Stout climbing herbs, with villous stems. *Leaves* cordate, often more or less lobed. *Flowers* in very dense axillary cymes; bracts narrow, deciduous. *Sepals* 5, sub-equal, herbaceous, hispid or glabrous, acute or obtuse. *Corolla* small, yellowish-white; tube hirsute externally, narrowed and shortly cylindric at base, urceolate above; limb shortly 5-lobed. *Stamens* 5, included; filaments dilated at their bases into 5 sub-equal, concave scales arched over the ovary; *disk* large cupular. *Ovary* 2-celled; ovules 4; style very short; stigma 2-partite, sub-capitate. *Fruit* a 4-valved capsule. *Seeds* glabrous.—DISTRIB. Species 3, S.E. Asiatic and African.

LEPISTEMON FLAVESCENS, Bl. Bijdr. 722. A climber with stout fulvous-villous stems. *Leaves* ovate-cordate, acute, entire or often distinctly 3-lobed, densely tawny-tomentose on both surfaces; 3 to 5 in. wide; petiole 1 to 2 in. long. *Flowers* yellowish-white in closely 10-30-flowered axillary cymes, sessile or on short peduncles .25 to .5 in. long; bracts tawny-hirsute, .2 in. long, deciduous. *Sepals* 5, rather narrowly ovate to lanceolate, sub-acute to rather finely acuminate, densely patently sub-strigose, .35 to .4 in. long. *Corolla* narrow and hyaline at the base, membranous and from slightly to widely urceolate above; tube hirsute externally; limb widely infundibuliform. *Stamens* 5, the basal processes papillose or hirsute, included in the lower part of the corolla-tube and overarching the short style; filaments glabrous, included in the upper part of the corolla-tube. *Ovary* 2-celled; ovules 4; style very short; stigma 2-lobed, lobes sub-globose. *Capsule* ovoid, glabrous, 2-celled, 4-valved, .25 in. long, normally 4-seeded. *Seeds* glabrous. Miq. Flor. Ind. Bat. II. 629; Prain Journ. As. Soc. Beng. LXIII. 2, 111; Wight Ic. t. 1362; Choisy in DC. Prod. IX. 348. *L. Wallichii*, Choisy Convolv. Or. 61, and in DC. Prod. IX. 348; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus cephalanthus*, Wall. Cat. 1402. *C. binectariferus*, Wall. in Roxb. Flor. Ind. ed. Carey & Wall. II. 47. *Vallaris controversa*, Spreng. Syst. cur. post. 65. *Ipomœa Wallichii*, Steud. Nomencl. Bot. *Nemodorus* sp., Griff. Notul. IV. 286.

PERAK : Larut, *Scortechini* n. 1544! Goping, *King's Collector* 987 f 1059!—DISTRIB. Assam, Tenasserim, Chittagong, Java, Borneo, Philippines.

The three gatherings from Perak agree with each other in every respect. They differ from the plant as it occurs in Tenasserim, in having a more widely urceolate corolla and even longer and more lanceolate sepals; at the same time they differ from the plant as it occurs in the Malay Archipelago, in having the sepals narrowly lanceolate and acuminate, instead of ovate and sub-acute. As regards corolla, however, they are exactly like the species as it occurs elsewhere in Malaya. Since the Perak plant combines the characters of the two previously recognised species—*L. Wallichii* with long acuminate sepals and *L. flavescens* with wide-urceolate corolla—it appears to afford conclusive proof of the suggestion already made by Clarke, *l.c.*, that the Assamese and the Malayan plants are no more than forms of one somewhat variable species. An Indian form occurs in Travancore; this has been characterised by Stapf as a distinct species, *L. leucocalyx*, probably quite justly, since the Travancore plant has quite glabrous and obtuse sepals: the same form occurs in Chittagong; otherwise, however, the Indian plant agrees with the forms reported from Indo-China and Malaya.

#### IPOMŒA, Linn.

Herbs, rarely shrubs, twining or prostrate, less often sub-erect or erect. *Leaves* alternate, entire lobed or divided. *Flowers* axillary, solitary or in cymes, the cymes rarely paniculate, or in terminal spikes; bracts various. *Sepals* 5, ovate or linear, equal or unequal. *Corolla* campanulate or infundibuliform; limb plicate, very slightly 5-lobed. *Stamens* 5, included or very rarely exserted; filaments filiform or dilated at the base, often somewhat unequal; anthers straight or contorted; pollen spinulose. *Ovary* 1–3-celled, rarely 4-celled; ovules 4, rarely 6; style filiform, stigma capitate, entire or 2–3-globose, rarely stigmas 2, linear. *Fruit* a 4–6-valved capsule, rarely indehiscent. *Seeds* 4, less often 6, rarely solitary, glabrous, bearded, or uniformly velvety or woolly.—DISTRIB. Species about 300, throughout the tropics.

Leaves softly pubescent or densely hirsute on both surfaces:—

Leaves deeply 5–7-lobed; flowers densely capitate with a whorl of involucre bracts .. .. .

1. *I. Pes-Tigridis*.

Leaves entire or slightly 3-lobed; flowers in congested cymes, with often one of the bracts foliaceous .. .. .

2. *I. Leari*.

Leaves glabrous or only slightly hirsute or pubescent:—

Leaves all deeply 5- or more-lobed, glabrous:—

Leaves digitately 5-lobed, lobes nearly if not quite distinct at the base; flowers more or less white .. .. .

3. *I. pulchella*.

Leaves palmately 5–7-lobed, lobes not as a rule more than three-fourths cut to the base; flowers purplish-pink .. .. .

4. *I. paniculata*.

Leaves entire or slightly lobed or if (rarely) deeply lobed the lobes only 2:—

Flowers in few-flowered axillary cymes:—

Cymes corymbose and lax or flowers 2 or solitary:—

Terrestrial, firm-stemmed plants :—

Flowers purple :—

Leaves ovate-cordate, acute or acuminate, entire or more or less lobed :—

Cultivated species with tuberous edible roots, often without flowers, rarely with seeds .. 5. *I. Batatas*.

Wild plants or if grown in gardens with the roots not edible :—

Large stout climbers on bushes near sea-coasts; flowers large, 4 in. long; sepals obtuse .. .. 6. *I. illustris*.

Slender climbers; flowers never more than 1·5 in. long; sepals acute or acuminate :—

Climbing or trailing herbs on sea-beaches; flowers 1·5 in. long .. .. 7. *I. denticulata*.

Climbing herbs in gardens, or garden escapes; flowers ·5 in. long .. 8. *I. triloba*.

Leaves oblong, obtuse or 2-lobed; littoral sand-binding creepers .. .. 9. *I. Pes-Caprae*.

Flowers white or yellowish-white; leaves oblong or linear-oblong, emarginate, sometimes lobed, occasionally lyrate; littoral sand-binding creepers .. 10. *I. littoralis*.

Aquatic or palustrine herbs; stems soft, thick and spongy, trailing and rooting on wet mud or floating in ponds and ditches, flowers purple .. .. 11. *I. reptans*.

Cymes subumbellate, dense; flowers pale purple, or white with a darker purple eye .. .. 12. *I. sagittifolia*.

Flowers in many-flowered rather condensed axillary panicles; flowers white, slightly tinged with pink .. 13. *I. staphylina*,  
VAR. *malayana*.

1. *IPOMŒA PES-TIGRIDIS*, Linn. Sp. Pl. 162. A hirsute twining herb; stems patently hirsute. *Leaves* hirsute on both surfaces, deeply 5-9-lobed, lobes elliptic, acuminate, narrowed at the base; length 1 to 5 in., width 1 to 4 in.; petiole 1 to 2 in. long. *Flowers* densely capitate, on axillary hirsute peduncles ·5 to 3 in. long; the heads surrounded by a whorl of fulvous-hirsute bracts, the outer ovate or elliptic-oblong with cuneate or rounded bases 1 in. long, the inner narrower acute ·5 to ·75 in. long. *Sepals* lanceolate, acute, tawny-hirsute, ·3 to ·5 in. long, scarcely altered in fruit. *Corolla* 1·25 in. long, sparsely strigose externally, infundibuliform with rather narrow tube and abruptly widened mouth, pink. *Capsule* ovoid, ·25 in. long, glabrous, chartaceous. *Seeds* minutely velvety. Roxb. Flor. Ind. ed. Carey & Wall. II. 93; Bl. Bijdr. 709; Wight Ic. t. 836; Choisy Convolv. Or. 73, and in DC. Prod. IX. 363; Clarke in Hook. f. Flor. Brit. Ind. IV. 204; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus Pes-Tigridis*, Spreng. Syst. I. 592; Wall. Cat. 1374. *C. bryoniaefolius* Salisb. Prod. 125. *Convolvuloides palmata*, Moench. Meth. 452. Rheede Hort. Malab. XI. t. 59.



**MALACCA:** *Griffith!*—**DISTRIB.** Tropical Africa, S.E. Asia generally.

2. *IPOMŒA LEARII*, Paxt. Bot. Mag. VI. 267. A large hirsute climber, with perennial root. *Leaves* widely or deeply cordate, acute, entire or slightly 3-lobed, softly sparingly hirsute above, more densely beneath; length 3 to 6 in., width 2 to 5 in.; petiole hirsute, 2 to 3 in. long. *Flowers* in congested 3-7-flowered cymes on axillary softly pubescent peduncles 3 to 7 in. long; bracts linear acuminate .3 to .4 in. long, with casually a foliaceous bract 1.5 in. long, .3 to .5 in. wide, with a cuneate, less often sub-cordate base, close to the flowers. *Sepals* lanceolate, acuminate, .75 in. long, pubescent. *Corolla* abruptly campanulate from a narrow cylindric base, tube 2.75 to 3 in. long, purple-blue or mixed red and blue, changing with age. *Fruit* not seen. *I. congesta*, Prain Journ. As. Soc. Beng. LXIII. 2, 104 (not of R. Br.). *Pharbitis Learii*, Hook. Bot. Mag. t. 3928; Choisy in DC. Prod. IX. 343.

**SINGAPORE:** *Hullett!*—**DISTRIB.** Cultivated throughout the tropics, native of America.

Mr. Hullett, whose plant was probably an escape, notes on his specimen (*Hullett* 646): "January, 1885. blue convolvulus, wild? Have never seen it in seed."

3. *IPOMŒA PULCHELLA*, Roth Nov. Sp. 115. A glabrous twining herb. *Leaves* glabrous, digitate, 5-lobed, lobes ovate-acute, base cuneate, central largest 1.25 to 1.5 in. long, .5 to .75 in. wide, basal smallest .5 to .75 in. long, .3 to .5 in. wide; petiole glabrous, .75 to 2 in. long. *Flowers* in axillary 1-3-flowered cymes, peduncles .25 to 1.25 in. long; bracts minute, deciduous, pedicels .5 in. long, with small ovate sub-persistent bracteoles below the middle. *Sepals* ovate, glabrous, .2 to .25 in. long, the inner obtuse, the outer sub-acute. *Corolla* campanulate, 2 in. long, white or with a tinge of rose. *Capsule* globose, glabrous, .5 in. wide. *Seeds* villous. Wight Ic. 158; Choisy in DC. Prod. IX. 386. *I. palmata* Clarke in Hook. f. Flor. Brit. Ind. IV. 386 in part (not *I. palmata*, Forsk = *I. carrica*, Sweet).

**MALACCA:** *Mangay.* **SINGAPORE:** Tanglin, *Ridley* 5817!—**DISTRIB.** India, Indo-China.

Mr. Ridley's specimens may be from plants escaped from cultivation; they are noted as "from behind the stable, Tanglin." This is one of two species often cultivated in India under the name of the "Railway Creeper"; the other species so termed is the American *Merremia quinquefolia*, Hallier f.; the latter we have not yet received from the Malay peninsula, though it has already escaped and become domesticated near Port Blair in the Andamans.

4. *IPOMŒA PANICULATA*, R. Br. Prod. I. 486. A large scandent perennial climber with a tuberous root; stems glabrous. *Leaves* palmately 5-7-lobed, glabrous, the lobes sometimes cut almost to

the base, lanceolate or elliptic, often spathulate; length 3 to 7 in., width 2·5 to 6 in.; petiole 2 to 5 in. long. *Flowers* in many-flowered axillary cymes, on peduncles 2 to 6 in. long; pedicels ·25 to ·75 in. long; bracts deciduous. *Sepals* elliptic, shortly acute, glabrous, ·25 to ·3 in. long, enlarged and concave in fruit, ·4 to ·5 in. long. *Corolla* 1·5 to 2·25 in. long, glabrous externally, wide-campanulate, purplish-pink. *Stamens* 5, anthers straight. *Ovary* 4-celled for three-fourths of its height or throughout. *Capsule* ovoid, ·3 in. long, 4-celled throughout, 4-valved. *Seeds* woolly with long hairs which protrude from the chinks of the capsule. Bl. Bijdr. 709; Bot. Reg. t. 62; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus paniculatus*, Linn. Sp. Pl. 223; Roxb. Flor. Ind. I. 478, and ed. Carey & Wall. II. 63; Wall. Cat. 1350; Spreng. Syst. I. 591. *C. platensis*, Spreng. Syst. I. 591. *C. insignis*, Spreng. Syst. I. 592. *C. roseus*, Kunth in Humb. & Bonpl. III. 108 (not of Miller). *Ipomœa digitata*, Linn. Syst. ed. X. 924; Meissn. in Mart. Fl. Brasil. VII. 278; Choisy in DC. Prod. IX. 389; Clarke in Hook. f. Flor. Brit. Ind. IV. 202. *I. mauritiana*, Jacq. Hort. Schoenbr II. 39, t. 200. *I. gossypifolia*, Willd. Enum. Hort. Berol. 208. *I. eriosperma*, Beauv. Fl. Owar. & Benin II 73, t. 105. *I. insignis*, Andr. Bot. Rep. t. 665; Bot. Reg. t. 75; Bot. Mag. t. 1790. *I. tuberosa*, G. F. W. Mey. Prim. Fl. Esseq. 102. *I. platensis*, Ker-Gawl. Bot. Reg. t. 333; Bot. Mag. t. 3685; Choisy in DC. Prod. IX. 387. *Batatas paniculata*, Choisy Convolv. Or. 54, t. 1, f. 2, and in DC. Prod. IX. 339; Wight Madr. Journ. Lit. IV. t. 11. *B. edulis*, var.  $\gamma$ , Choisy in DC. Prod. IX. 339.

PERAK: *Scortechini*! PENANG: Wallich 1350! Deschamps! SINGAPORE: Chan-chu-kang, Ridley 3909!—DISTRIB. Cosmopolitan in the tropics.

5. *IPOMŒA BATATAS*, Lamk Encycl. Meth. VI. 14. A trailing or twining glabrous or sparingly hairy herb with tuberous roots; tubers red, white, or occasionally yellow. *Leaves* ovate-cordate, acute, entire or angular or somewhat lobed; 2 to 4 in. long, 2 to 3·5 in. wide; petiole 2 to 5 in. long. *Flowers* in few-flowered cymes, very often none produced, on axillary peduncles 1 to 4 in. long; pedicels ·25 to ·5 in. long; bracts small, lanceolate, deciduous. *Sepals* narrowly oblong, acute, the outer shorter, ·5 to ·6 in. long. *Corolla* 1 to 2 in. long, purplish, glabrous externally, campanulate. *Stamens* 5, filaments slightly hirsute at the base. *Ovary* 4-celled, glabrous, half-enveloped by the undulate disk. *Capsule* 4-celled, or casually 3-1-celled by suppression. *Seeds* glabrous. Bl. Bijdr. 712; Meissn. in Mart. Fl. Brasil. VII. 282; Clarke in Hook. f. Flor. Brit. Ind. IV. 202; Hallier f. Bull. Herb. Boiss. V. 380. *I. Catesbæi*, G. F. W. Mey. Prim. Fl.

Esseq. 103. *Convolvulus Batatas*, Linn. Sp. Pl. 154; Roxb. Flor. Ind. I. 483, and ed. Carey & Wall. II. 69; Wall. Cat. 1356. *C. indicus*, Moris. Hist. II. sect. I. t. 3, f. 4. *C. edulis*, Thunb. Fl. Japon. 84. *C. esculentus*, Salisb. Prod. 123. *Batatas edulis*, Choisy Convolv. Or. 53, and in DC. Prod. IX. 338. *B. xanthorrhiza* Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 130. Rheede Hort. Malab. VII. t. 50.

PERAK: Larut; *Scortechini* 1836! but doubtless also present in other provinces, cultivated.

The Sweet Potato; very rarely seen in flower, still more rarely in fruit. A native of America, but now grown throughout the tropics.

6. *IPOMŒA ILLUSTRIS*, Prain Beng. Pl. II. 735. A glabrous climber. *Leaves* ovate or oblong, cordate or hastate, entire, glabrous, apex acuminate; nerves rather prominent; 4 to 6 in. long, 3.5 to 5 in. wide; petiole 1.5 to 2 in. long. *Flowers* in axillary cymes; peduncles 1 to 1.5 in. long, usually 2-3-flowered, often 1-flowered; bracts caducous; pedicels .5 to 1.5 in. long. *Sepals* orbicular, obtuse, glabrous, .3 to .4 in. long. *Corolla* rather wide-campanulate, purple, 4 to 4.5 in. long, glabrous, limb 3 in. wide. *Capsule* .5 in. wide, globose. *Seeds* with long silky hairs. *I. campanulata* var. *illustris*, Clarke in Hook. f. Flor. Brit. Ind. IV. 211.

ANDAMANS: on the coasts, everywhere. PENANG: Pulo Boetong, *Curtis* 1970!—DISTRIB. Coasts of Ceylon, Sunderbuns, Indo-China, and Malay Archipelago.

This is very nearly allied to *I. campanulata*, Linn., which appears, however, to be always an inland species, whereas this is always a littoral plant. *I. illustris* differs further in having flowers at least one-half larger, sepals quite glabrous, and fewer flowers to the cyme.

7. *IPOMŒA DENTICULATA*, Choisy in DC. Prod. IX. 379 (not of R. Br.). A glabrous trailing or twining littoral herb. *Leaves* ovate-cordate, acute, entire denticulate angled or sub-lobate, base rather deep-cordate with an obtuse sinus, firm in texture but hardly fleshy; 1 to 2.5 in. long, .75 to 1.75 in. wide; petiole 1.5 in. long. *Flowers* axillary on short 1-3-flowered peduncles, never more than 1.5 in. long; pedicels (often only one) 1 to 1.25 in. long; bracts .2 in. long, linear. *Sepals* elliptic, abruptly acute, sub-scarious, .4 in. long. *Corolla* 1.5 in. long, tube funnel-shaped, abruptly widening at the mouth, purple. *Ovary* 2-celled. *Capsule* globose, .3 in. in diam., glabrous. *Seeds* smooth. Benth. Fl. Austr. IV. 421; Clarke in Hook. f. Flor. Brit. Ind. IV. 298; Hallier f. Engl. Bot. Jahrb. XVI. 554. *I. littoralis*, Bl. Bijdr. 713 Thw. Enum. 211 (not of Boiss.). *I. subdentata*, Miq. Fl. Ind. Bat. II. 614. *I. cymosa*, Bak. Fl. Maurit. 208 (not of Roem. & Schult.). *I.*

*nicobarica*, Kurz in Journ. As. Soc. XLV. 2, 141. *Convolvulus denticulatus*, Lamk Encycl. Meth. III. 540.

PERAK: Dindings, *Scortechini* 1066! *Curtis* 3449! PENANG: Bagian Jumal, *Curtis* 1974! PAHANG: Rumpin, *Ridley*! NICOBARS: common. ANDAMANS: very common.—DISTRIB. Coasts of the Indian and Pacific Oceans, from the Seychelles to Polynesia.

This species, in the writer's experience, prefers shingle beaches, though occasionally it is to be met with on sandy beaches along with *I. biloba*.

8. *IPOMŒA TRILOBA*, Linn. Sp. Pl. 229. A twining or prostrate herb with glabrous slightly angular stem. *Leaves* cordate, acuminate to an often rounded tip, entire or toothed or occasionally 3-lobed; 1·5 to 2 in. long, 1·25 to 1·75 in. wide; petiole slender, 1·75 to 2 in. long. *Flowers* in axillary 1-4-flowered cymes; peduncles 1 to 1·5 in. long; bracts lanceolate, .2 in. long, deciduous; pedicels .25 to .35 in. long. *Sepals* lanceolate, acuminate, ciliate with spreading yellowish hairs, .35 in. long. *Corolla* tubular, purple, .5 in. long. *Capsule* pilose. Choisy in DC. Prod. IX. 383.

SINGAPORE: *Hullett*!—DISTRIB. Cultivated in the tropics; native of America.

Under his n. 68, Mr. Hullett sent to Calcutta, in 1884, as *Ipomœa corcinea*, a mixture of two species, one of which is *Quamoclit pharicea*, the other being *Ipomœa triloba*, as they are not noted as cultivated it seems possible that *I. triloba* may at least casually occur as an escape at Singapore. For the detection of this mixture, which had not been observed by the writer when arranging the Calcutta *Convolvulacæ* in 1894 (see Journ. As. Soc. Beng. LXIII. 2, 88 *et seq.*), we are indebted to Dr. H. Hallier.

9. *IPOMŒA PES-CAPRÆ*, Roth Nov. Sp. 109. A glabrous extensive sand-binding creeper. *Leaves* orbicular or oblong, obtuse emarginate or 2-lobed; 1 to 4 in. long and sometimes wider than long; thick, fleshy, when dry distinctly nerved; petiole 1 to 4 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles 1 to 4 in. long; bracts .2 in. long, lanceolate, deciduous; pedicels .75 to 1·5 in. long. *Sepals* ovate, obtuse, glabrous, .5 to .6 in. long, slightly enlarged in fruit. *Corolla* tubular-campanulate, glabrous, 2 in. long, purple. *Capsule* ovoid, glabrous, .5 in. long. *Seeds* villous. Choisy Convolv. Or. 63, and in DC Prod. IX. 349; Meissn. in Mart. Fl. Brasil. VII. 256; Hallier f. Bull. Herb. Boiss. V. 381. *I. biloba*, Forsk. Flor. Ægypt.-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. maritima*, R. Br. Prod. 486; Bl. Bijdr. 720; Bot. Reg. t. 319. *Convolvulus Pes-Capræ*, Linn. Sp. Pl. 159; Roxb. Hort. Beng. 14, Flor. Ind. f. 486, and ed. Carey & Wall. II. 74; Wall. Cat. 1360. *C. maritimus*, Lamk Encyc. Meth.

15. QUAMOCLIT, Mœench.

Leaves ovate-cordate, entire or lobed .. .. . 1. *Q. pharnicea*.  
Leaves ovate, deeply pinnately divided into numerous linear segments 2. *Q. pinnata*.

SINGAPORE: *Hullett* !—DISTRIB. Widely naturalised throughout S.E. Asia, native of America.

2. QUAMOCLIT PINNATA, Boj. Hort. Maurit 224. A slender glabrous twining herb. *Leaves* ovate in outline, deeply pinnately divided into

numerous distant linear segments, glabrous; 3 to 5 in. long, 2 to 3 in. wide; petioles 1 to 3 in. long. *Flowers* in axillary lax few-flowered cymes; peduncles slender, 2 to 4 in. long; pedicels erect, if more than one virgate; bracts minute. *Sepals* 5, elliptic, .25 in. long, hardly changed in fruit. *Corolla* dark red, occasionally in cultivated varieties white; tube slender, 1 in. long; limb salver-shaped, somewhat oblique, .75 in. across. *Stamens* 5, exserted. *Capsule* smooth, ovoid, .3 in. long, completely 4-celled with membranous persistent septa. *Seeds* puberulous. Hallier f. Engl. Bot. Jahrb. XVIII. 154. *Q. vulgaris*, Choisy Convolv. Or. 52, and in DC. Prod. IX. 336. *Convolvulus pinnatus*, Desr. in Lamk Encyc. Meth. III. 567. *C. Quamoclit*, Spreng. Syst. I. 591; Wall. Cat. 1375. *Ipomœa Quamoclit*, Linn. Sp. Pl. 159; Bot. Mag. t. 244; Bl. Bijdr. 708; Roxb. Hort. Beng 14, Flor. Ind. ed. Carey & Wall. II. 93, and Flor. Ind. I. 502; Clarke in Hook f. Flor. Brit. Ind. IV. 199.

PENANG: Batu Gaja jungles, *Deschamps* !—DISTRIB. Widely naturalised in S.E. Asia, native of America.

#### 16. CALONYCTION, Choisy.

Large herbaceous climbers, stems usually muricate. *Leaves* large, cordate, entire or angled. *Flowers* solitary or in few-flowered axillary cymes, bracts caducous. *Sepals* 5, herbaceous, smooth, usually aristate, sub-equal or the outer smaller. *Corolla* large, salver-shaped, white or rose-purple, tube narrow-cylindric, limb plicate. *Stamens* 5, adnate to corolla-tube, considerably exserted. *Ovary* glabrous, 2-locular; ovules 4, style filiform; stigma 2-globose. *Fruit* a 4-valved capsule. *Seeds* 4, dull, glabrous.—Species 6 to 7, all tropical American, 2 now widespread and sub-spontaneous in the tropics of the Eastern Hemisphere.

CALONYCTION BONA-NOX, Boj. Hort. Maurit. 227. A large climber, stems smooth or muricate, glabrous. *Leaves* ovate-cordate, acute, glabrous, entire or casually lobed; 3 to 8 in. long, 2 to 4 in. wide; petiole 3 to 6 in. long. *Flowers* on axillary 1-5-flowered peduncles, 2 to 6 in. long, bracts caducous. *Sepals* 5, usually ovate, obtuse with a mucro, very slightly enlarged in fruit, glabrous; .5 in. long. *Corolla* 3 in. long, tube linear, .2 in. wide, limb salver-shaped, 3 to 5 in. wide, white. *Stamens* 5, slightly unequal, distinctly exserted. *Capsule* ovoid-oblong, narrowed upwards, 1 in. long; peduncle in fruit slightly thickened. *Seeds* glabrous. Hallier f. Bull. Herb Boiss. V. 1028. *C. noctilucum*, Don in Sw Hort. Brit. ed. III. 482. *C. speciosum*, Choisy Mem. Soc. Gen. VI. 441, t. 1, f. 4, and in DC. Prod. IX. 345, Hallier f. Engl. Bot. Jahrb. XVI. 556; XVIII. 153. *C. Roxburghii*, G. Don Gen. Syst. IV. 263. *Convolvulus aculeatus*, Linn. Sp. Pl. ed. I. 155. *C. bona-nox*

Spreng. Syst. I. 600. *C. grandiflorus*, Linn. f. Suppl. 136; Willd. Sp. Pl. I. 2. 859; Pers. Synops. I. 179; Wall. Cat. 1370. *C. latiflorus*, Desr in Lamk Encyc. Meth. III. 561. *Ipomœa bona-nox*, Linn. Sp. Pl. ed. II. 228; Roem. & Schult. Syst. IV. 217; Bl. Bijdr. II. 712; Kurz For Fl. Burm. II. 217; Clarke in Hook. f. Flor. Brit. Ind. IV. 197. *I. grandiflora*, Lamk III. I. 467, and Encyc. Meth. III. 16; Roem. & Schult. Syst. IV. 240; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 87, and Flor. Ind. I. 497. *I. Roxburghii*, Steud. Nomencl. ed. II. 1, 819. *I. noctiflora*, Griff. Not. IV. 286.

PENANG: cultivated, Haller. SINGAPORE: S. Mayer 211.—DISTRIB. Throughout the tropics; possibly not truly wild in our area.

### 17. ARGYREIA, Lour.

Climbing rarely sub-erect shrubs. *Leaves* cordate to lanceolate, pubescent or silky. *Flowers* axillary, usually in many-flowered cymes, often sub-capitate, bracts often conspicuous. *Sepals* 5, herbaceous in flower; in fruit leathery but little enlarged, often red within. *Corolla* funnel-shaped, rose-purple, tube more or less hirsute externally; limb plicate, shortly 5-lobed. *Stamens* 5, included, anthers oblong, straight. *Disk* annular. *Ovary* 4-celled; ovules 4, style filiform; stigma 2-globose. *Fruit* a hard dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 30, in the tropics of the Old World chiefly, and mostly in S.E. Asia and Polynesia.

ARGYREIA OBTUSIFOLIA, Lour. Flor. Cochinchin. 135. A large climber. *Leaves* elliptic or oblong, acute or obtuse, with or without a sub-mucronate tip, base cuneate or occasionally rounded, upper surface pilose, under surface silky strigose, nerves 9 to 11 pairs, often rather distinct beneath, very oblique even in wide-leaved plants, length 5 in., breadth 1.5 to 3 in., petiole 6 to 8 in., very rarely 1 to 1.5 in. long. *Flowers* axillary; peduncles usually short, .6 to 1 in., but occasionally 1.5 to 3 in. long, cymes sub-capitate, the pedicels .1 to .2 in. long; bracts ovate, .15 to .2 in. long, caducous. *Sepals* 5, ovate-obtuse, .25 in. long, densely silky-strigose externally, sub-patent in fruit, pale red within. *Corolla* 1.5 in. long, tubular-campanulate, densely uniformly hirsute externally. *Capsule* .4 in. in diam., globose, pericarp chartaceous, pink. *Seeds* finely grey-velvety, hemispheric, .2 in. in diam. Choisy in DC. Prod. IX. 333. *Convolvulus obtectus*, Wall. Cat. 1416. *Rivea* ? *obtecta*, Choisy, Convolv. Or. 28, and in DC. Prod. IX. 326. *Argyrea Champoni*, Benth. Fl. Hongkong, 236. *A. obtecta*, Clarke in Hook. f. Flor. Brit. Ind. IV. 186. *Lettsomia Champoni*, Benth. & Hook. f. Gen. Pl. II. 869.

PERAK: *Scortechini* 1384! KEDAH: Langkawi, Curtis 2852!—

DISTRIB. Indo-China, from the Andamans and Tenasserim to Cochin China, Hongkong.

The two varieties distinguished in the *Flora of British India* can no longer be maintained in view of the large suites of specimens reported of late years from the Andamans, where the species is exceedingly common

# 18. LETTSOMIA, Roxb.

Scandent, more or less hirsute or strigose shrubs. *Leaves* cordate rounded or truncate. *Flowers* in axillary, peduncled, corymbose or capitate cymes, bracts conspicuous. *Sepals* 5, orbicular or elliptic; somewhat thickened and coriaceous in fruit. *Corolla* usually pink; tube infundibuliform-campanulate; limb plicate, very shortly 5-lobed *Stamens* 5, exserted or included, anthers oblong or linear, straight *Disk* annular or cupular *Ovary* 2-celled; ovules 4; style filiform, stigma 2-globose *Fruit* a dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB Species about 40, in tropical Africa and S.E Asia.

There is not, as the writer has already explained (*Journ As Soc Beng.* LXIII 2, 91), any very good reason for retaining *Lettsomia* as a genus apart from *Argyreia*. In *Argyreia* the ovary is completely 4-celled, in *Lettsomia* it is 2-celled, but not infrequently a partial dissepiment of smaller or larger size is to be found at the base of, sometimes half-way up, the cell.

Capsule chartaceous; seeds usually 4, only casually fewer; leaves cordate, softly hairy; cymes capitate, bracts large, elliptic oblong, sub-persistent . . . 1 *L. peguensis*.

Capsule coriaceous or sometimes somewhat fleshy, seeds usually 1, only casually 2 -

Cymes compact, bracts large, persistent —

Cymes capitate, globose, bracts purple, large, orbicular obtuse, leaves ovate-lanceolate, sparingly adpressed-hirsute 2 *L. sphaerocephala*

Cymes sub capitate, hardly globose, bracts ovate or ovate-lanceolate, acute, leaves ovate or elliptic, base rounded or shortly cuneate -

Corolla 2-25 in long, leaves chartaceous, glabrous and shining above, a few hairs on petiole and midrib beneath . . . 3 *L. Masgayi*

Corolla 1-25 in long; leaves firmer, glabrous not shining above, hirsute beneath —

Leaves hirsute, more especially on the nerves, beneath; petioles sparingly hairy . . . 4 *L. Ridleyi*  
Leaves densely hirsute beneath throughout; petioles densely hairy . . . 4a. *L. Ridleyi*,  
var. *velutina*.

Cymes lax, bracts small, rarely with a casual foliaceous bract in a cyme, and usually caducous —

Sepals narrowly lanceolate, acute, spreading or sub-reflexed in fruit; bracts lanceolate, occasionally one large and leaf-like; leaves elliptic; softly hairy on both surfaces . . . 5. *L. adpressa*.



Sepals ovate or orbicular, obtuse or rarely some of them emarginate, bracts minute, usually caducous, leaves glabrous above —

Sepals irregular, the three outer entire rounded, sparingly hairy, the two inner wider deeply emarginate, all closely embracing the base of the fruit, leaves elliptic shortly acuminate, sparingly adpressed pubescent beneath

6 *L. Curtissii*

Sepals regular or nearly so, all entire

Corolla 1.5 to 1.75 in long —

Sepals sub equal, at length almost glabrous and somewhat spreading in fruit, leaves elliptic oblong, chartaceous, glabrous or very sparingly pubescent beneath

7 *L. penangiana*

Sepals persistently adpressed grey pubescent outside, the inner rather larger than the outer, closely embracing the base of the fruit, leaves ovate acute, firm, sparsely hirsute with rusty hairs beneath

8 *L. Scortechinii*

Corolla .5 to .75 in long, leaves elliptic acuminate, sepals closely embracing the base of the fruit —

Leaves densely tawny tomentose beneath, sepals all softly tawny velvety the inner rather the smaller, corolla .75 in long

9 *L. rubicunda*

Leaves sparingly stigose hirsute beneath, sepals sub equal, the outer pubescent the inner at length almost glabrous

10 *L. Kunthii*

1 *LITTSOMIA PIGUIENSIS*, Clarke in Hook f Flor Brit Ind IV 193  
A large climber, sometimes 50 feet long, with villous stems and branches. *Leaves* ovate, ovate lanceolate or sub orbicular, apex acute, base cordate, both surfaces densely softly hairy, tomentum fulvous but not acicular, length 4 to 6 in, width 1.5 to 3.5, rarely 5 to 6 in, petiole 1.5 to 4 in long. *Flowers* in axillary capitate cymes, peduncles 5 to 9 in long, bracts sub persistent, densely softly hairy, elliptic oblong, 1 in long. *Sepals* 5, the outer elliptic acute, rather larger than the inner lanceolate, densely hispid 5 to 7 in long. *Corolla* infundibuliform campanulate, softly sparsely hairy externally, 2 in long, limb and upper two thirds of tube bright pink, base of tube nearly or quite white. *Berry* when ripe glossy brown, sub globose thin-walled, .25 in across. *Seeds* usually 2 or 4. *Plin Journ As Soc Beng* LXIII 2, 94. *L. strigosa*, Roxb Hort Beng 13, ex Wall Cat sub n 1404. *L. capitata*, Miq Flor. Ind Bat II 591. *Argyrea capitata*, Choisy in DC Prod IX 332, partly and including var  $\beta$  *conferta* Kurz For Flor Burm II 216 mainly. *Convolvulus strigosus*, Wall Cat 1365/2, 1365/c, and 1365/e partly. *C. barbigera*, Wall Cat 1404/1, 1404/2 in part. *Argyrea barbigera*, Choisy Convolv Or 42, and in DC Prod IX 332.

PERAK Batu Krian, *Scortechini* 1628' near Goping, *King's Collector* 1077' Larut, *King's Collector* 2622' near Ulu Keiling, *King's Collector* 8627' PENANG Bateh Pulo, *Deschamps* ' SELANGOR Woods at Gua Batu, *Ridley* 8210' 8227' 10194'—DISTRIB Burma, Tenasserim, Sumatra, Java.

Probably only a geographical form of *Ittsonia striigosa* Roxb which is widespread in Indo China and extends to S China.

2 *LETTSONIA SPHÆROCEPHALA*, Plain Joun As Soc Beng LXXIII 2, 19 A shrubby climber, branches irregularly angled, with ridged bark brownish on young shoots, pale straw coloured on older twigs, sparingly beset with adpressed acicular hairs. *Leaves* ovate lanceolate, apex acute, base rounded, purplish beneath very sparingly beset on both surfaces with adpressed hairs, length 4 to 5 in, width 1 5 to 2 in, petiole 1 to 1 25 in, sparsely pubescent above with adpressed hairs. *Flowers* in compact capitate globose cymes 1 5 to 2 in across, on long slender peduncles 2 to 12 in long, sparingly adpressed pubescent, surrounded by large orbicular purple involucrent sessile bracts 1 5 in across, sparsely hirsute externally, quite glabrous internally, the individual flowers enveloped in similar but smaller sub orbicular to spatulate bracteoles 5 in long, 2 5 to 5 in wide, pedicels short adpressed-setose. *Sepals* glabrous externally except at their setose apices, the outer sub acute, the inner wider obtuse 2 5 in long. *Corolla* 7 5 to 1 in long infundibuliform campanulate, pink, softly adpressed hirsute externally. *Berry* not seen. *Argyria sphærocephala*, Plain MSS.

PERAK Krian, Abu Salima Gunong Harau Ryah, *Scortechini* '.

A very striking and remarkable species. The corollas do not appear to be full sized. *Scortechini* on the ticket of his Gunong Harau Ryah specimens has written fruit from Maxwell's Hill, but unfortunately the fruiting specimens alluded to are not at Calcutta.

3 *LETTSONIA MAINGAYI*, Clarke in Hook f Flor Brit Ind IV 195 A large slender climber, branches slender or stoutish, with spreading setulose hairs. *Leaves* ovate or elliptic, base rounded or very shortly cuneate, apex acute or shortly caudate acuminate, papery, glabrous and shining on both surfaces except for a few hairs on the midrib beneath, length 5 to 7 in, width 3 to 4 in, lateral nerves 5 to 7, petioles 5 to 1 in long, very sparsely setulose. *Flowers* in axillary few flowered cymes 2 to 3 in wide, peduncles 2 5 to 2 in long, rather closely hirsute with tawny spreading hairs, bracts ovate-lanceolate, 1 5 in long, 6 in wide, rather strongly parallel nerved, sparingly hirsute externally, glabrous and dark purple within, bracteoles similar but smaller, 3 in long. *Sepals* linear lanceolate, long-acuminate, 7 5 in

long, beset with long setulose hairs. *Corolla* tubular campanulate, purple with whitish folds, 2.25 in long, hairy externally. *Stamens* with filaments glandular hairy at the thickened base. *Berry* ellipsoid, succulent, 7 in long, 5 in wide. *Seed* solitary.

MALACCA *Griffith, Manqay, Derry* 318! *Goodenough* 1432! PERAK *Scortechinii* 297!

A very distinct species. There is no fruiting specimen in Herb. Calcutta, the above description of the berry is taken from the *Flora of British India*.

4. *LETTSOMIA RIDLEYI*, *Prain Journ. As. Soc. Beng.* LXIII 2, 98. A large climber, branches sparingly hirsute. *Leaves* elliptic acuminate, quite glabrous above, hirsute especially on the nerves beneath. 5.5 in long, 3.5 in wide. *Petiole* 1 to 3 in long, sparsely hirsute. *Flowers* in compact subcapitate 8-10 flowered cymes 1.5 in across, surrounded by large ovate acute sessile foliaceous persistent bracts hirsute below, quite glabrous above, 8 in long, 2.5 in wide, bracteoles similar but smaller, 3 in long, peduncles 2 to 6 in long hirsute. *Sepals* subequal, ovate lanceolate, externally pubescent, 3 in long. *Corolla* pink infundibuliform campanulate 1.25 in long, tube hirsute externally. *Berry* ovoid, 5 in long, 3 in in diam, the sepals spreading from its base.

JOHORE *Kota Tinggi, Ridley* 1211! Chin chin, *Lake & Acland*! SINGAPORE *Bukit Mandai, Ridley*!

VAR. *reticulata* *Prain* l.c. *Leaves* beneath densely hirsute, as are the petioles, pedicels and bracts externally.

SINGAPORE *Bukit Mandai, Ridley*!

Nearest to *L. sphaerophylla* but distinguished by the acute bracts and bracteoles and to *L. Manqayi* from which it differs by the smaller flowers and shorter bracts and sepals. Var. *reticulata* in foliage and tomentum remarkably resembles *L. reticulata* but the acute sepals and large persistent bracts and bracteoles amply distinguish it.

5. *LETTSOMIA ADRIANSSA*, *Miq. Flor. Ind. Bat.* II 591. A scandent shrub, branches hirsute, stems 10 to 30 feet long. *Leaves* elliptic, softly hirsute on both surfaces, base rounded or cuneate, apex acute, length 4 to 5 in, width 2 to 2.5 in. *Petiole* 1.5 in long, softly hirsute. *Flowers* in axillary few flowered somewhat open cymes 2 in across. *Peduncles* 5 to 1.5 in long hirsute. *Bracts* lanceolate, hirsute, 3 in long, 1.5 in wide, with an occasional longer leaf like bract, bracteoles small. *Sepals* 3 to 5 in long, narrowly lanceolate, sparingly hirsute, spreading or subreflexed in fruit. *Corolla* tubular campanulate, dull claret, or pale pink and white or white with claret stripes, externally hairy, tube 1.25 in long. *Berry* ellipsoid, 5 in long, 3 in wide, at first green with a reddish tint, becoming bright pink, and at length, when quite ripe, reddish brown. *Clarke in Hook. f. Flor. Brit. Ind.* IV 196.

*Convolvulus adpressus*, Wall. Cat. 1424. *Moorcroftia adpressa*, Choisy Convolv. Or. 49, and in DC. Prod. IX. 334.

PENANG: Porter! Kunstler 1324! 5271! Curtis 318! MALACCA: Mangay! PERAK: Scortechini 1280! King's Collector 2457! 5400! Wray 1914! 3298! 3961!

6. *LETTSOMIA CURTISII*, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A climber with brown glabrous branches. *Leaves* elliptic, shortly acuminate, glabrous except for a few hairs on the midrib above, sparingly adpressed-hirsute beneath, length 4 to 5 in., width 2.5 to 3 in., petiole 2 to 3 in. long, glabrous. *Flowers* in axillary compound sub-umbellate cymes, 3 in. wide, 12-16-flowered; peduncles 4 to 10 in. long, brown, glabrous, bracts deciduous. *Sepals* coriaceous, .25 in. long, the three outer sparingly hirsute, rounded, entire, the two inner wider, deeply emarginate, glabrous. *Corolla* not seen. *Berry* ovoid, succulent, .75 in. long, .5 in. wide, lower third closely embraced by the sepals.

SELANGOR: Kwala Lampar, Curtis 2158!

A very distinct species, easily differentiated by its emarginate inner sepals.

7. *LETTSOMIA PENANGIANA*, Miq. Flor. Ind. Bat. III. 592. A climber with very slender stems sometimes 100 feet long, young branches thin, fulvous-tomentose, soon becoming glabrous. *Leaves* elliptic-oblong, base rounded or cuneate, apex acute or sub-acute, papery, medium green glabrous above, very light green and glabrous or sparingly adpressed-pubescent and more closely hairy on the midrib beneath, 6 in. long, 2.5 in. wide, petiole 5 to 1 in., glabrous. *Flowers* in lax axillary cymes 2 to 3 in. across, the terminal flower usually longer than the others, peduncles slender, 2 to 6 in. long, very sparsely hirsute, soon glabrous, pedicels .3 to .7 in. long, slender, hirsute, bracts minute. *Sepals* ovate-obtuse, sparingly hairy and at length glabrescent, .2 in. long, at length spreading or sub-reflexed. *Corolla* tubular-campanulate, externally hirsute, bright claret or purple within, paler without, 1.5 to 1.75 in. long. *Berry* ovoid, 6 in. long, .3 in. wide, rose-pink, reddish-blue, or purple. Clarke in Hook. f. Flor. Brit. Ind. IV. 196; Prain Journ. As. Soc. Beng. LXIII. 2, 99. *Convolvulus penangianus*, Wall. Cat. 1425. *Moorcroftia penangiana*, Choisy Convolv. Or. 50, t. 4., and in DC. Prod. IX. 335.

PENANG: Porter! Curtis 1586! PERAK: very common; Scortechini 1147! Wray 2061! 2095! 2334! 2733! Curtis 2034! Derry! King's Collector 1936! 2048! 2574! 3223! 5339!

VAR. *reticulata*, Prain Journ. As. Soc. Beng. LXIII. 2, 100. *Leaves* thicker, secondary nerves beneath very distinct.

PERAK Larut, King's Collector 8544<sup>1</sup>

The leaves of this species are very characteristically glandular punctate beneath. The peduncles and pedicels of var. *reticulata* are rather shorter than in the type and the corolla described by Kunth as 'waxy white pale blue inside' is only two thirds the length and only half the width of that of *L. penanpana* proper. But the leaves have the same characteristic glandular punctulation and are similarly sparingly adpressed pubescent beneath while the fruit described by Kunth as a rich pink is indistinguishable from that of *L. penanpana*. This form therefore, though very distinct cannot yet be more than varietally separated.

8 *LEPTOSOMIA SCORTICHIINI* Planch Journ. As. Soc. Beng. LXIII 2, 198. A strong climber, stems rusty brown very sparingly pubescent. Leaves ovate acute, base rounded, finely sub coriaceous, very sparsely hirsute with scattered rusty hairs beneath, glabrous above, length 2 to 3 in., width 1 to 2 in., petiole 5 to 1 in., minutely sparingly rusty-pubescent. Flowers in open 3-8 flowered corymbose cymes 1 to 1.5 in. across, peduncles minutely sparingly rusty pubescent, 2 to 5 in. long, bracts caducous. Sepals orbicular, minutely adpressed grey-tomentose externally, in flower 2.5 in., in fruit 3 in. across, the inner larger than the outer. Corolla 1.5 in. long, infundibuliform campanulate, pink, densely adpressed fulvous tomentose on tube and bands of limb externally. Berry sub spherical to ellipsoid, 5 in. wide, 5 to 7.5 in. long, the base closely embraced by the sepals.

PERAK Canfield's Hill 4000 feet, *Scortichini* 381<sup>1</sup>. Birch's Hill, Ridley 10681<sup>1</sup>. Maxwell's Hill Ridley 5559<sup>1</sup>.

As in the case of *L. rubicunda* (one or two bracts remain on the specimen) they are small orbicular 2 in. across but it does not follow that the fallen bracts were so small. The corollas on *Scortichini*'s specimens on which the original description was based are about 6 in. long but subsequent material communicated by Mr Ridley (Ridley 5559) shows that the flowers originally described were not fully expanded. Another of Mr Ridley's specimen (10681) proves that the berry is not always sub spherical. The species is obviously closely allied to *L. rubicunda* but besides the very different degree of tomentum *L. Scortichini* differs from *L. rubicunda* in having the inner sepals distinctly larger instead of smaller than the outer.

9 *LEPTOSOMIA RUBICUNDA* Clarke in Hook. f. Flor. Brit. Ind. IV 195. An extensive climber, stems fulvous tomentose. Leaves elliptic, shortly abruptly acuminate or acute, base rounded, sub coriaceous, densely tawny tomentose beneath, glabrous above, length 5 to 7 in., width 2 to 4 in., petiole tawny tomentose 1 to 2 in. long. Flowers in open many flowered corymbose cymes 2 to 4 in. across, peduncles tawny tomentose, 3.5 to 7 in. long, bracts caducous. Sepals orbicular, obtuse, softly tawny velvety, in flower 2 in., in fruit 3 in. across, the inner rather smaller. Corolla 7.5 in. long, infundibuliform campanulate, pink, densely tawny tomentose externally. Berry ellipsoid, obtuse,

smooth, dry, 75 in long, 3 to 5 in wide, the base closely embraced by the sepals *Convolvulus rubicundus*, Wall Cat 1409 *Argyrea rubicunda*, Choisy Convolv Or 44, and in DC Prod IX 333

**MALACCA** Griffith! Mangay—**DISTRIB** Burma

The above description is taken from Griffith's Malacca plant, the writer has seen no other specimens. One or two bracts remain, they are small 2 in across, and orbicular, but it does not follow that the fallen bracts were so small. There is no perfect corolla on the specimens at Calcutta, the length of the tube given above is derived from Mr C B Clarke's description.

10 LETTSOMIA KUNSTLERI, Pisin Journ As Soc Beng LXIII 2, 100 A slender climber, 50 to 80 feet long, young branches densely hirsute. Leaves elliptic-acuminate, glabrous and shining above, sparingly strigose hirsute beneath, especially on the nerves, occasionally the midrib above sparsely hairy, length 3.5 to 4.5 in, width 2 to 2.5 in, petioles densely hirsute, 1 to 1.5 in long. Flowers in lax axillary 12-20-flowered cymes, 2 to 3 in across, peduncles 5 to 8 in long, densely hirsute, bracts hirsute, 3 in wide, pedicels hirsute, slender, 5 to 7.5 in long. Sepals orbicular, subequal, the three outer pubescent, the others at length almost glabrous, 1.5 in long. Corolla white externally, bright pink or red within, externally hirsute, tubular-campanulate, 5 in long. Berry ovoid, 5 in long, 3 in wide, deep glossy red.

**PERAK** Larut, Kota, Wray 2856! Ulu Salama, Scortechini! Goping, Chandriang, &c, King's Collector, 732! 2307! 2726! 5672! Campon Road, Ridley 9704! **SELANGOR** Batu Caves, Ridley 8220!—**DISTRIB** Sumatra

## Order LXXXII SOLANACEÆ.

[By D PRAIN]

Herbs or shrubs, sometimes becoming small soft wooded trees. Leaves alternate or at times in unequal pairs, rarely clustered, never truly opposite, entire, lobed or pinnate, stipules 0. Inflorescence of terminal or oftener lateral axillary or extra axillary cymes, or of solitary or clustered pedicels, without bracts or bracteoles. Flowers regular, hermaphrodite. Calyx inferior, gamosepalous, lobes or teeth usually 5, rare 4 or 6 to 10, usually persistent, sometimes enlarged in fruit. Corolla gamosepalous 5-lobed or rarely (*Datura*) 10 lobed or with limb subentire, narrow-campanulate to rotate. Stamens 5, epipetalous, anthers oblong or narrow ovate, cells parallel, dehiscing by apical pores or longitudinally. Ovary 2-celled or imperfectly

1-celled by abortion, or 4 celled by subsequent development of accessory dissepiments, style linear, stigma capitate or shortly lobed, ovules indefinite, on peltate intruded placentas. *Fruit* indehiscent, berry like or capsular and opening by valvular or circumscissile dehiscence, usually 2 celled, rarely 4 celled, many seeded. *Seeds* compressed, disc like or sub reniform with embryo periphragic, occasionally (*Nicotiana*) hardly compressed and with embryo straight.—**DISTRIB** Species about 1300, throughout tropical and sub tropical countries

Fruits berry like 2 celled indehiscent seeds compressed and embedded in pulp

Anthers opening by 2 small pores at the tips, fruits globular (in *Melomoma* sometimes elongated)

1 SOLANUM

Anthers dehiscing throughout longitudinally —

Calyx in fruit small fruits usually elongated

2 CAESICUM

Calyx in fruit enlarging and enveloping the globose berry

3 PHYSALIS

Fruits capsular

Capsules 4 celled and 4 valved or sometimes hardly dehiscing seeds compressed flowers solitary

4 DATURA

Capsules 2 celled dehiscing freely seeds hardly compressed flowers in panicles

5 NICOTIANA

# 1 SOLANUM, Linn

Armed or unarmed herbs shrubs or small trees. *Leaves* alternate or sub opposed in unequal pairs entire lobed or pinnatifid. *Cymes* dichotomous or racemose lateral or terminal. *Calyx* usually 5 lobed, rarely 10 lobed or sub entire sometimes enlarging in fruit. *Corolla tube* short, rotate or very shortly campanulate limb 5 lobed plicate in bud. *Stamens* 5 with short filaments adnate to throat of corolla, anthers oblong narrowed upwards so that the two cells form a cone opening at the tip by terminal pores. *Ovary* 2 celled (in cultivated forms sometimes 3 4 celled) style columnar stigma small. *Fruit* berry like but with calyx at base rarely overtopping it globose or (rarely) elongated. *Seeds* very numerous disk like embryo periphragic.—**DISTRIB** Species 750 mostly tropical American, but spread throughout all tropical and sub tropical regions

Unarmed herbs or shrubs

Flowers in extra axillary p. l. umbel cymes or racem

Leaves glabrous or sparingly pubescent cyme solitary umbellate calyx toothed 5 corolla and ovary labrous berry red or black rarely yellow

1 S. nigrum

Leaves densely stellately woolly cymes corymbose calyx teeth triangular 5 corolla and ovary hairy berry yellow

2 S. tomentosum

Flowers axillary pedicel fascicled or solitary corolla glabrous

- Calyx with a sub entire margin flowers white leaves glabrous epiphytic 3 *S. parasiticum*
- Calyx with a distinctly 10 toothed margin terrestrial —  
Leaves glabrous calyx with 5 long teeth and 5 very short intermediate toothlets corolla lobes purplish berry dark blue 4 *S. Blumei*
- Leaves usually puberulous to pubescent rarely almost glabrous, calyx with 10 long teeth corolla white berry yellow 5 *S. byflorum*
- Armed herbs with prickly stems and usually prickly leaves corolla pubescent externally
- Densely stellate tomentose throughout —  
Calyx not overtopping the berry erect herbs or shrubs  
Flowers white —  
Leaves very prickly especially on the nerves beneath ovary hirsute fruit hispid with acicular hairs 6 *S. ferax*
- Leaves with very few prickles ovary and fruit glabrous 7 *S. torium*
- Flowers blue  
Racemes many flowered berry small yellow globose 8 *S. indicum*
- Racemes few flowered berry large purple rarely white or yellow often in cultivation elliptical or elongate 9 *S. Melinena*
- Calyx overtopping the berry a spreading shrub 10 *S. sarmentosum*
- Thinly beset with minute hairs berry large smooth calyx very prickly 11 *S. aculeatissimum*

1 *Solanum nigrum* Linn Sp Pl 186 A herb or undershrub, 1 to 3 feet high all parts sparingly pubescent or glabrous. Leaves petioled membranous ovate or oblong narrowed towards apex and base, sinuate toothed or lobed 3 to 4 in long 2 in across green on both surfaces petioles 75 in long. Flowers small sub umbellately clustered on stoutish extra villous peduncles 35 to 75 in long pedicels 5 to 8 together slender 35 in long. Calyx sparsely puberulous, 5 toothed, teeth small ovate oblong 05 in long in fruit hardly noticeable. Corolla white rarely purplish externally glabrous, 5 in wide rotate, 5 lobed. Ovary glabrous style hairy at base. Fruit red or black, rarely yellow, globose 25 in across supported by the saucer shaped calyx. Seeds 05 in in diam almost smooth. Bl Bijdr 694, Dun in DC Prod XIII 150 Miq Flor Ind Bat II 636, Kunz For Flor Buin II 224 Clarke in Hook f Fl Br Ind IV 229 *S. rubrum*, Roxb Flor Ind I 565 *S. triangulare*, Lamk III II 18 *S. uliginosum* Bl Bijdr 695 *S. Humphu* Dun in DC Prod XIII 57 *S. rhinocercis* Bl Bijdr 695

SINGAPORE *Lulley* 8084! PERAK Kota Bahru, *King's Collector* 566! ANDAMANS *King's Collectors*! NICOBARS *Kurz*!—DISTRIBUTION generally

2 *Solanum verbascifolium*, Linn Sp Pl 184 An erect unarmed shrub, 8 to 20 feet high all parts thickly stellate tomentose, the



tomentum often scurfy. *Leaves* petioled, thickly herbaceous, ovate-lanceolate to lanceolate, acute, base usually truncate or rounded, rarely cuneate, 4 to 7 in long, 3 in across, green above, white to yellowish-brown beneath from the scurfy tomentum, petioles 5 to 15 in long. *Flowers* small, on thick tomentose pedicels, densely clustered in a small tomentose corymb like cyme on an erect sub-terminal stout peduncle 1 to 3 in long. *Calyx* densely tomentose, 5-toothed, teeth triangular, acute, 1 in long in flower 3 in. long in fruit, tube short. *Corolla* white, externally stellate-tomentose, 6 in across, rotate, 5 lobed, lobes short, ovate-oblong. *Ovary* hairy, style glabrous. *Fruit* yellow, globose, 4 in wide, the lower portion embraced by the calyx lobes. *Seeds* 12 in in diam, minutely dotted. *Dun* in DC' Prod XIII 114, *Lour* Flor Cochinchina 128, *Wall* Cat 2616, *Kurz* For Flor II 225, *Clarke* in Hook f Flor Brit Ind IV 230, *Miq* Flor Ind Bat II 640. *S. pubescens*, Bl Bijdr 698, *Roxb* Flor Ind ed Carey & Wall II 244 (not of Willd.)

SELANGOR Kwala Lumpur, Goodenough! PERAK King's Collector 2069! 7177! *Wray* 2357! PENANG *Deschamps*! KEDAH King's Collector 1704! NIOBORAS Kamoiti, *Jeleneh*! TELESSA, King's Collectors!—DISTRIBUTION Tropics of both hemispheres

3. *SOLANUM PARASITICUM*, Bl Bijdr 697. An erect almost glabrous epiphytic shrub, 2 to 4 feet high. *Leaves* short petioled, rather firmly membranous, lanceolate acuminate, narrowed towards apex and base, entire, 6 to 8 in long, 15 to 2 in wide, green on both surfaces, minutely setulose above when young, glabrous beneath, petiole 25 to 35 in long. *Flowers* small, clustered in an axillary fascicle of 2 to 7 together or sometimes solitary, on slender somewhat rigid glabrous pedicels 6 to 8 in long. *Calyx* glabrous, small, the margin in flower sinuate representing either 5 or 10 teeth at most only 1 in long, in fruit slightly enlarged, saucer shaped, the margin quite entire. *Corolla* white, glabrous externally, 5 lobed, rotate, 25 in across. *Ovary* and style glabrous. *Fruit* yellow globose, 25 in in diam, resting on the saucer shaped calyx. *Seeds* .06 in in diam, smooth. *Nees* Trans Linn Soc XVII 45, *Miq* Flor Ind Bat II 641.

PERAK Lulut on trees, rather plentiful, *Wray*! *Seortechni*! King's Collector!—DISTRIBUTION Sumatra, Java

Near *S. subtruncatum* but always epiphytic and with an even more markedly truncate calyx-limb than in that species.

4. *SOLANUM BLUMI* Nees ex Bl in Bijdr 696. An erect quite glabrous shrub, 3 to 4 feet high, with spreading branches. *Leaves* towards top in pairs from one node, usually one smaller, elliptic-acuminate at both ends, bases unequal, 4 to 6 in long, 2 to 3 in wide,

rather firmly membranous, lateral nerves 6 to 7 pairs, petiole 3 in long. *Flowers* in clusters of 2 to 9, rarely solitary, axillary, pedicels slender, in flower deflexed, in fruit spreading, 75 in long, thickened upwards. *Calyx* glabrous, limb sub-truncate with 5 subulate, and 5 intervening minute teeth the longer series 2 to 25 in long. *Corolla* with white tube and 5 purplish narrow ovate lobes, 3 in across. *Ovary* and style glabrous. *Fruit* globose, dark blue, 25 in in diam, resting on the saucer-shaped calyx with persisting teeth. *Seeds* 09 in in diam, almost smooth. Nees Trans Linn Soc XVII 45, Dun in DC Prod XIII 180, Miq Flor Ind Bat II 642.

SELANGOR Ridley! PERAK Laut, King's 'Collector' Wray! Curtis! Ridley! Scottichani! Gunong Pantu, Kunstler!—DISIRIB Sumatra, Java, Borneo

The commonest *Solanum* of its group in our area. It has been suggested by Clarke that there is little to separate this form specifically from *S. subtruncatum*, this is true, but there seems equally little to separate it specifically from *S. biflorum*. Its glabrous condition however at once distinguishes it from both as, if not a species at least a very marked form.

5 *SOLANUM BIFLORUM*, Lour. Flor Coch. Chin 129. An erect more or less pubescent shrub, 3 to 6 feet high, the young shoots often flocculose. *Leaves* membranous, elliptic or oblong, acuminate, base narrow cuneate entire, 3 to 5 in long, 1.5 to 1.75 in wide, green on both sides, setulose pubescent, rarely glabrescent with age, petiole 7 in long. *Flowers* small, clustered in axillary fascicles of 2 to 6 together, or solitary, pedicels slender, 65 in long. *Calyx* setulose pubescent, the margin usually 10 toothed rarely 7 9 toothed, teeth narrowly lanceolate, setulose, 15 in long. *Corolla* white, externally glabrous, rotate, 5 lobed, 25 in across. *Ovary* and style glabrous. *Fruit* globose, yellow, 25 in in diam, resting on the saucer shaped calyx with persisting teeth. *Seeds* 1 in in diam, almost smooth. Dun in DC Prod XIII 178, Kurz For Flor Burm II 224, Clarke in Hook f Flor Brit Ind IV 232. *S. decedentatum*, Roxb Hort Beng 16 and Flor Ind I 565, Wall Cat 2614, Miq Flor Ind Bat II 643. *S. mollissimum*, Bl Bijdr 698. *S. decensidum*, Nees Trans Linn Soc XVII 43. *S. Zollingeri*, Dun in DC Prod XIII 176.

MALACCA Griffith! SINGAPORE Wallich (Jule Clarke).—DISIRIB Throughout Indo-China and the Malay Archipelago.

Though so plentiful in the countries both south and north of the Malay Peninsula this seems very rare in our area where *S. Blumei* appears to replace it.

6 *SOLANUM ELIOTI*, Linn Sp Pl ed II 267. An erect prickly shrub, 3 to 10 feet high, with a short soft wooded trunk 2 to 3 in thick,

all the younger parts thickly covered with a brownish soft tomentum intermixed with many sharp compressed brownish prickles of unequal size. *Leaves* usually sub-opposite, membranous, ovate to nearly orbicular with irregular short triangular acute or blunt lobes, 5 to 9 in. long, 3 to 6 in. wide, the lobes often 1 in. deep, green above, brownish from the tawny tomentum beneath, sparingly beset on midrib and nerves with long compressed prickles, petioles .5 to 2.5 in. long, prickly. *Flowers* large, on thickish pedicels clustered in few-flowered sub-umbellate short-peduncled racemes set close below the leaves; peduncles and pedicels densely stellate-tomentose and beset with long acicular hairs. *Calyx* shortly funnel-shaped, densely hirsute, sometimes prickly, lobes ovate acute, .25 in. long. *Corolla* white, densely tomentose externally, nearly 1 in. across, lobes oblong-acute. *Ovary* hairy. *Fruit* yellow, globose, 1 in. in diam., hispid with acicular hairs, much exceeding the hardly altered calyx. *Seeds* 12 in. in diam., very slightly scrobiculate. *Dun* in DC. Prod. XIII. 255, *Kurz* For. Fl. Burm. II. 226 (incl. var.  $\beta$ ), *Miq* Flor. Ind. Bat. II. 616, *Clarke* in Hook. f. Flor. Brit. Ind. IV. 233. *S. lasiocarpum*, Bl. Bijdr. 701, *Wall.* Cat. 2623. *Dun* in DC. Prod. XIII. 252. *S. hirsutum*, Roxb. Hort. Bong. 17, and Fl. Ind. ed. Carey & Wall. II. 253. *S. stramonifolium*, *Dun* in DC. Prod. XIII. 252 (not of Jacq., nor of Wall., nor of Roxb.).

PIRANG. *Wallich*! PERAK. Sungah Ryah, *Kunstler* 1022! GUNONG Mesah, *King's Collector* 1026! SINGAPORE. *Wallich*! ANDAMANS. Port Blair, plentiful. NICOBAR. Nancowry, *King's Collector*! —DISTRIB. India, Indo-China, S. China, Sumatra, Java.

7. *Solanum rostratum*, Sw. Prod. Veg. Ind. Oce. 17. An erect sparingly arched shrubby perennial, 3 to 6, or at times even 8 to 12 feet high, all parts shortly and sparsely stellate pubescent, with but few compressed sharp scattered prickles. *Leaves* usually sub-opposite, membranous, ovate, shortly acuminate, sinuate or lobed, the lobes obtuse or acute, the base truncate very unequal, 2 to 4 in. long, 1.5 to 3 in. across, rather sparingly pubescent above, more closely sometimes scurfily pubescent beneath, petioles .5 to 1 in. long. *Flowers* medium, in lateral usually extra-axillary corymbose cymes with short pubescent peduncles, pedicels slender, 3 to 4 in. long, pubescent. *Calyx* sparsely pubescent, 5 toothed, .25 in. long, without prickles, the teeth ovate-lanceolate acute, .1 in. long, not enlarging in fruit. *Corolla* white, externally stellate pubescent, 5 in. across, rotate, 5 lobed, the lobes 3 in. long lanceolate acuminate. *Ovary* glabrous. *Fruit* yellow, supported by the calyx which becomes glabrous in fruit, globular, 4 in. across. *Seeds* 2 in. in diam., compressed, minutely granular. *Dun.* in DC. Prod. XIII. 260. *Wight* Ic. t. 315, *Miq* Flor. Ind. Bat. II.

648, Clarke in Hook f Flor Brit Ind IV 234 *S stramonifolium*, Roxb Flor Ind I 572

PENANG Wallich ' Deschamps ' Ridley ' MALACCA Griffith ' PERAK King's Collector 1085 ' Scortechini 60 ' SINGAPORE Schomburgk ' Hullett ' Kunstler 99 ' Ridley ' ANDAMANS very common — DISTRIB Malayan Archipelago, Indo-China, Philippines, China, India, Tropical America

This is often exceedingly like the next species, *S indicum*, but is easily distinguished by its white flowers and its considerably larger fruits

8 SOLANUM INDICUM, Linn Sp Pl 187 partly, Nces in Trans Linn Soc XVII 55 An erect, armed, branching shrub, 4 to 8 feet high, all young parts thickly covered with a short stellate tomentum, with broad, compressed, sharp, slightly recurved prickles. Leaves membranous or thinly herbaceous, ovate, sinuately lobed, the lobes obtuse or acute, the base obliquely truncate, 1.5 to 3 in long, 1 to 2 in wide, above minutely tomentose, green, grey from the denser tomentum beneath, petioles 5 to 1 in long. Flowers medium, in lateral or spuriously terminal racemes about 2.5 to 3 in long, pedicels 2 to 3 in long, sometimes prickly and grey stellate pubescent, as are the peduncles. Calyx grey stellate-pubescent, 5-toothed, .25 in long, prickly or not, the teeth lanceolate acute, hardly enlarging in fruit. Corolla blue, externally stellate-pubescent, .5 in across, rotate, 5 lobed, the lobes .35 in long. Ovary glabrous. Fruit yellow or orange, small, supported by the hardly altered calyx, globose, .25 in in diam. Seeds 15 in in diam, minutely dotted. Lour Flor Cochinchina 131, Roxb Flor Ind I 570, Wall Cat 2626, Wight, Ic t 346, Dun in DC Prod XIII 309, Miq Flor Ind Bat II 651, Kurz For Fl Burm II 226, Clarke in Hook f Flor Brit Ind IV 234 *S violaceum*, Jacq Fragm 82, t 133, f 1 (not of R Br) *S cuneatum*, Moench Meth n 476, Poir Suppl III 743 *S canescens*, Bl Bijdr 701 *S Junghuhnii*, Miq Flor Ind Bat II 649

PENANG Wallich ' SINGAPORE King's Collector 363 ' PERAK Wray 3077 ' ANDAMANS Prain '—DISTRIB Throughout SE Asia

This species often is very like *S torvum* it is readily distinguished by its usually, though not invariably more numerous prickles by its blue flowers, and its smaller fruits

9 SOLANUM MELONGENA, Linn Sp Pl 186 A stout erect, sparingly armed herb, 2 to 8 feet high all the younger parts covered with a grey soft tomentum. Leaves membranous, ovate or oblong, irregularly sinuately lobed, 3 to 6 in long, 2 to 4 in wide, green above, stellately pubescent beneath with a few prickles on the nerves or sometimes

quite unarmed; petiole 1 in. long. *Flowers* large, on extra-axillary often paired peduncles, one peduncle with a solitary perfect flower the other with a few-flowered raceme of male flowers; peduncles stellate-tomentose, very rarely prickly. *Calyx* shortly funnel-shaped, densely pubescent; lobes oblong-acute; .25 to .35 in. long, enlarging slightly in fruit, usually armed. *Corolla* blue, externally pubescent, 1 to 1.25 in. across, 5-lobed, lobes oblong-acute, short. *Ovary* glabrous; style stellate-pubescent or at times glabrous. *Fruit* large, ovoid, obovoid, ellipsoid, or cylindric; usually dark purple, often with white spots or streaks, sometimes uniformly white or yellowish, always glabrous, sometimes as much as 6 in. long and always much longer than the calyx. *Seeds* .12 in. in diam., slightly scrobiculate. Lour. Flor. Cochinchin. 180; Roxb. Flor. Ind. I. 566; Miq. Flor. Ind. Bat. II. 653; Clarke in Hook. f. Flor. Brit. Ind. IV. 235. *S. insanum*, Roxb. Flor. Ind. I. 568. *S. undatum*, Lamk Encyc. IV. 301; Bl. Bijdr. 700. *S. longum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 567. *S. pseudo-undatum*, Bl. Bijdr. 699. *S. ovigerum*, Bl. Bijdr. 698. *S. Trongum*, Lamk Encyc. IV. 308. *S. ferox* var. *Trongum*, Kurz For. Flor. Burm. II. 226.

In all the provinces, cultivated; occasionally also as an escape from cultivation or sub-feral (e.g., at Trang, King's Collector 1416!)

The Egg-Plant, or Brinjal, largely cultivated in all warm countries; originally American. As an escape this species tends to become more prickly and to have 3 to 4 fruits on the peduncle, owing to the males being replaced by perfect flowers. In such cases the fruits are much smaller and often approach, or sometimes even attain a globose form.

10. *SOLANUM SARMENTOSUM*, Nees Trans. Linn. Soc. XVII. 58. A straggling prickly shrub with procumbent zigzag branches, 2 to 3 feet long; all parts sparsely hairy and covered with long, straight, sharp prickles. *Leaves* membranous, broadly elliptic, sub-pinnatifid, lobes obtuse, sub-glabrescent above, sparsely stellately pubescent and prickly beneath; 4 in. long, 2 in. across, the lobes .75 in. deep, green on both surfaces; petioles .6 in. long. *Flowers* large, with thickish pedicels on 1-2-flowered, extra-axillary peduncles about 1 in. long, sparsely stellate-pubescent. *Calyx* with very shortly funnel-shaped tube, lobes ovate-acuminate .2 in. long, sparsely hairy and prickly, much enlarged in fruit. *Corolla* blue, externally pubescent, .7 in. across; lobes oblong-acute. *Ovary* glabrous. *Fruit* yellow, globose, glabrous, .5 in. across, overtopped by the enlarged caudate-acuminate, adpressed, armed calyxlobes, .75 in. long and .35 in. wide. *Seeds* .12 in. in diam., scrobiculate. Dun. in DC. Prod. XIII. 357; Clarke in Hook. f. Flor. Brit. Ind. IV. 236. *S. Melongena*, Wall Cat. 2628 (F. only—not of Linn.). *S. Jacquinum*, Miq. Flor. Ind. Bat. II. 651 (not of Willd.).

PENANG: Wallich! PERAK: Scortechini! MALACCA: Griffith.  
PAHANG: Ridley!—DISTRIB. Malay Archipelago

11. SOLANUM ACULEATISSIMUM, Jacq. Col. I. 100. An armed slender undershrub, 2 to 3 feet high, with glabrous stems covered with very many long, straight, slender prickles. *Leaves* only on the upper part of the stems, membranous, ovate, lobed, sparsely hairy; 3 to 5 in. long. *Flowers* on 1-7-flowered peduncles, that are usually only 1-fruited; peduncles in fruit .75 in. long. *Calyx* even in fruit small, under .25 in. long, very prickly. *Fruit* globose, 1.25 in. across, smooth. *Seeds* .2 in. in diam., extremely compressed, almost winged. Jacq. Icon. I. t. 41; Clarke in Hook. f. Flor. Brit. Ind. IV. 237. *S. aculeatissimum* var. ? *denudatum*, Dun. in DC. Prod. XIII. 244.

SINGAPORE: G. Thomson.

This is not in Herb Calcutta. The above meagre description is taken from the accounts of Dunal in the *Prodromus*, and of Clarke in the *Flora of British India*. The specimen to which Clarke refers is one of the "varieties" of Dunal, not the true *S. aculeatissimum* of Jacquin, and Dunal himself was not satisfied that it is to Jacquin's species of this name that the variety should be referred. As it has not again been reported, it is possible we may have here to deal with an unusual state of some casually introduced and perhaps well-known American species.

## 2. CAPSICUM, Linn.

Unarmed annual or perennial, glabrous or glabrescent herbs or shrubs. *Leaves* alternate, entire or repand. *Flowers* axillary, solitary or several together. *Calyx* campanulate, minutely 5-toothed, not enlarging in fruit. *Corolla-tube* short, rotate, limb 5-lobed, valvate in bud. *Stamens* 5, adnate near base of corolla, anthers oblong, not longer than filaments, dehiscing longitudinally. *Ovary* 2-celled, rarely 3-celled; style columnar, stigma small. *Fruit* resembling a berry, but with the calyx at its base, elongated or (rarely) globose. *Seeds* very numerous, disk-like; embryo peripheric.—DISTRIB. Species 2 or more, natives of America.

The number of species is doubtful, and depends on the point of view of the reviewer with regard to the many more or less distinct forms assumed by the plants under cultivation; some writers recognise as many as 80, others claim only about 20; more recent authors insist only on 2 species—a perennial (*C. frutescens*), and an annual (*C. annuum*), both very variable. Possibly, however, there is but a single very variable species, for in the tropics the forms of *C. annuum* are often not truly annual, and in temperate regions the perennial tropical forms rarely persist for more than a season.

Pedicels solitary, variously erect or reflexed; fruits erect or spreading or pendent, at least as long as, usually longer than, the pedicels; plants annual or biennial.—

Flowers white, berries at first green, afterwards becoming red, orange or yellow.—

Fruit not globular.—

Berries tapering, much longer than broad —

Fruit stout, flesh thick, usually mildly pungent; calyx not enclosing base of berry .. .. 1. *C. annuum*.

Fruit slender, flesh thin, keenly pungent, calyx enclosing base of berry .. .. { *annuum*,  
VAR. *acuminata*.

Berries not much if at all longer than broad, usually obtuse, calyx not enclosing base of berry —

Berries circular in section, sub-conical, ovate or oblong, flesh thin, pungent .. .. { *annuum*,  
VAR. *abbreviata*.

Berries swollen, irregularly angled in section, prismatic, quadrate or oblate, flesh very thick, hardly at all pungent { *annuum*,  
VAR. *grossa*.

Fruit globular, extremely pungent .. .. { *annuum*,  
VAR. *cerasiformis*

Flowers purple; berries at first dark-purple, afterwards becoming orange-red, much longer than broad, only slightly pungent; calyx hardly enclosing base of berry .. .. { *annuum*,  
VAR. *nigra*.

Pedicels 2 or more, erect; fruit always erect, red, shorter than the pedicels, pungent; plants perennial, flowers always white or yellowish-white —

Berries elongated, tapering; base embraced by the calyx .. .. 2. *C. frutescens*.

Berries globose or sub-globose; base seated on the calyx .. { *frutescens*,  
VAR. *baccata*

1. *CAPSIUM ANNUM*, Linn. Sp. Pl. 188. An erect branching or rarely simple robust herb 2 to 3 feet high, with slightly ridged branches; glabrous throughout. *Leaves* membranous, elliptic or ovate, rather long-acuminate, base long-cuneate, prolonged as a wing on upper part of petiole, margin entire, lamina 3 in. long, .75 to 1 in. wide, rarely 1.5 in. wide, green on both surfaces; petiole .25 to .6 in. long. *Flowers* white or rarely (VAR. *nigra*) purple, pedicels almost always solitary, though casually there may be more than one in a leaf-axil, always drooping in flower, in fruit rigid, slightly thickened under the enlarging calyx and variously erect, or spreading or recurved and pendent, then .75 to 1 in. long. *Calyx* glabrous, campanulate, with sinuate-dentate limb, .2 in. across; in fruit enlarging into a shallow cup embracing the lower part of fruit, or saucer-shaped with the base of the fruit resting on it, then often .5 in. across. *Corolla* rotate, .4 in. across; 5-lobed. *Ovary* glabrous. *Fruit* erect, straight, very variable in shape, colour, fleshiness and pungency. Irish Miss. Bot. Gard. Rep. IX. 65.

VAR. *typica*. Fruit much longer than broad, stout, tapering to the usually narrow apex; flesh thick, mildly pungent; berry resting on the saucer-shaped fruiting calyx; colour variable.

In gardens, occasionally, usually raised from seed imported from Europe.

This variety includes the many mild chillies which do not keep true to their characters when their seed is collected in the tropics.

**VAR. *acuminata***, Fingerhuth. Fruit much longer than broad, slender, rarely straight, always tapering to an acute or sub-acute apex; flesh thin, keenly pungent; berry enclosed at the base by the cupular calyx; colour red or orange, or yellow *C. longum*, DC. Hort. Monsp. 86; Fingerhuth, Caps. 23, t. 6, 7, Dun. in DC. Prod. XIII. 424. *C. frutescens*, Roxb. Hort. Beng. 17, Flor. Ind. I. 574; Bl. Bijdr. 704; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Cultivated in most of the provinces.

Some of the forms of this variety seem to have been evolved since the introduction of *Capsicum annuum* to the Eastern Hemisphere.

**VAR. *abbreviata***, Fingerhuth. Fruit conoid, ovate or oblong, not much longer than broad, apex usually blunt, flesh thin, pungent; berry resting on the saucer-shaped fruiting calyx; colour variable. *C. annuum*, Roxb. Flor. Ind. I. 573. *C. frutescens*, Dun. in DC. Prod. I. 413. *Capo Molajo*, Rheede Hort. Malab. II. 109, t. 56.

Occasionally cultivated.

**VAR. *grossa***, Sendt. Fruit swollen, somewhat angular, prismatic or quadrate or oblate, obtuse, hardly longer than broad; flesh thick, hardly pungent; berry resting on the saucer-shaped fruiting calyx; colour red. *C. grossum*, Linn. Mant. 47, Willd. Sp. Pl. I. 1051; Roxb. Hort. Beng. 17, Flor. Ind. I. 574, Fingerhuth, Caps. 21; Dun. in DC. Prod. XIII. 422, Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Occasionally cultivated.

**VAR. *cerasiforme***, Mill. Fruit globular, red, flesh thin, very pungent. *C. cerasiforme*, Roxb. Flor. Ind. I. 574. *C. grossum*, var. *cerasiforme*, Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Sometimes grown in gardens by European residents.

**VAR. *ugra***. Fruit much longer than broad; flesh thin, only slightly pungent, calyx hardly enclosing base of fruit; berry at first dark purple, at length becoming orange-red. *C. purpureum*, Roxb. Flor. Ind. IV. 239.

Occasionally cultivated.

2. **CAPRICUM FRUTESCENS**, Linn. Sp. Pl. 189. An erect, much-branching undershrub, 2 to 4 feet high, branches angled, the smaller ones puberulous but soon, like the leaves, becoming quite glabrous. Leaves petioled, membranous, ovate-acute, the base short-cuneate, truncate or rarely sub-cordate, the margins entire; lamina usually 2.5 to 4 in. long, 1.5 in. wide, green on both surfaces; petiole .5 to .75 in. long. Flowers small, white or yellowish-white, pedicels usually 2 to 3, sometimes 4 or more together in leaf-axils, never all of the same age, drooping in



flower and erect, thickened, rigid and somewhat elongated in fruit, 1 to 1.25 in. long. *Calyx* glabrous; limb truncate with 5 shortly projecting, spreading teeth .12 in. in diam. *Corolla* .2 in. in diam., rotate, 5-toothed. *Ovary* glabrous. *Fruit* erect, narrow to globose, bright red, .2 to .25 in. in diam. Irish Miss. Bot. Gard. Rep. IX. 97.

*VAR. typica.* Fruits ovate or sub-cylindric, acute, .75 in. long, .2 in. in diam. *C. frutescens*, Wall. Cat. 2642 B.C. *C. minimum*, Roxb. Hort. Beng. 17, Flor. Ind. ed. Carey & Wall. II. 261, and ed. propr. I. 574; Wall. Cat. 2641; Blanco, Flor. Filip. 133; Dun. in DC. Prod. XIII. 415; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239. *C. fastigiatum*, Bl. Bijdr. 705, Nees Trans. Linn. Soc. XVII. 64; Dun. in DC. Prod. XIII. 416; Wight Ic. t. 1617, Miq. Flor. Ind. Bat. II. 659; Benth. & Trim. Med. Pl. t. 188.

In all the provinces, cultivated and as an escape.

*VAR. baccata*, Irish Ic. 99. Fruit elliptic-obtuse or globose, .25 to .3 in. long, .25 in. in diam. *Capsicum baccatum*, Linn. Ment. 46; Ham. in Wall. Cat. 2644. *C. angustifolium*, Dun. in DC. Prod. XIII. 420.

NICOBARS. cultivated, *Jelnech* 137! 138!

### 3. PHYSALIS, Linn

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Pedicels* axillary, solitary. *Calyx* campanulate, 5-partite in flower, the tube much enlarged and inflated in fruit, loosely enclosing the berry; teeth small, connivent. *Corolla* campanulate, yellow. *Stamens* 5, attached near base of corolla; anthers oblong, shorter than filaments, dehiscent longitudinally. *Ovary* 2-celled; style columnar; stigma obscurely 2-lobed. *Fruit* berry-like, globose. *Seeds* few or many, disk-like; embryo peripheric.—*DISTRIB.* Species about 34, mostly tropical American.

*PHYSALIS MINIMA*, Linn. A herbaceous pubescent or glabrescent annual, erect or with procumbent straggling branches, 6 to 15 in. high. *Leaves* petioled, ovate, sinuate angular or hardly lobed, 2 in. long, .75 in. wide, green on both surfaces; petioles 1 in. *Flowers* small, axillary, solitary, pedicels .25 to .5 in. *Calyx* hirsute or glabrescent, in flower .1 to .2 in., with lanceolate lobes as long as tube, in fruit .75 to 1 in., ovoid or sub-globose, 5-10-ribbed, the teeth subconnivent and little altered. *Corolla* yellow, .25 in. across, glabrous, campanulate, 5-toothed. *Ovary* glabrous. *Fruits* yellow, globose, .5 in. across, completely enveloped by the accrescent calyx. *Seeds* very many, .1 in. in diam., discoid, reticulated, hardly scabrous.

*VAR. typica*; calyx not distinctly angled, all parts more or less pubescent. *P. minima*, Linn. Sp. Pl. 183; Nees in Trans. Linn. Soc.

XVII. 69; Roxb. Flor. Ind. I. 563; Dun. in DC. Prod. XIII. 445; Clarke in Hook. f. Flor. Brit. Ind. IV. 238; Miq. Flor. Ind. Bat. II. 664. *P. parviflora*, R. Br. Prod. 447. *P. divaricata*, Don Prod. 97. *P. villosa*, Roth Nov. Sp. 122. *P. Rothiana*, Roem. & Schult. Syst. IV. 677. *P. Hermann*, Dun. in DC. Prod. XIII. 444.

PERAK: *Scortechini*! MALACCA: *Griffith*! ANDAMANS: common in waste places.—DISTRIB. A cosmopolitan tropical weed.

VAR. *indica*, Clarke Flor. Brit. Ind. IV. 238; calyx distinctly 5-angled, all parts nearly glabrous. *C. indica*, Lamk Encyc. Meth. II. 102; Nees in Trans. Linn. Soc. XVII. 70; Dun. in DC. Prod. XIII. 443; Miq. Flor. Ind. Bat. II. 662. *P. pseudoangulata*, Bl. Bijdr. 706; Miq. Flor. Ind. Bat. II. 663. *P. angulata*, Griff. Notul. IV. 96. *Nicandra indica*, Roem. & Schult. Syst. IV. 632.

PERAK: Kota Bahru, *Kunstler*, 568! Ipoh, *Curtis* 3190! PENANG: *'Deschamps*! common. SELANGOR: *Ridley* 10548! NICOBARS: coasts, common.—DISTRIB. India generally.

The Cape Gooseberry, or Winter Cherry (*Physalis peruviana*), is cultivated in European gardens in the cold weather

#### 4. DATURA, Linn.

Suffrutescent, rank-smelling, glabrous or minutely pubescent herbs. *Leaves* large, entire, sinuate or deeply toothed. *Pedicels* solitary, flowers very large, purple or white. *Calyx* long-tubular, herbaceous, apex 5-toothed; in fruit circumscissile above the base. *Corolla* narrowly tubular-funnel-shaped; throat widened, limb plaited, entire or shortly lobed. *Stamens* attached near base of tube, filaments filiform; anthers included, linear, dehiscing longitudinally. *Ovary* 2-celled, or 4-celled by the formation of spurious dissepiments; style filiform; stigma 2-lobed. *Fruit* a capsule, ellipsoid, 4-celled, spinous, more or less completely 4-valved. *Seeds* very many, compressed, rugose; embryo peripheric.—DISTRIB. Species 10, temperate and tropical

DATURA FASTUOSA, Linn. Syst. ed. X. 932. A coarse annual, 3 to 8 feet high, all parts glabrescent or very faintly puberulous. *Leaves* petioled, membranous, ovate, entire or deeply toothed, glabrous, green; 6 to 8 in. long, 3 to 4 in. across, base unequal; petioles 1 in. *Flowers* very large, solitary, pedicels .25 to .5 in., erect in flower, recurved in fruit. *Calyx* tubular, 2.5 to 3 in. long, .5 in. wide, lobes lanceolate, .25 in. long. *Corolla* purple or white, 7 in. long, base .5, throat 1.5, limb 3 to 5 in. in diam., shortly 5-6-toothed. *Ovary* glabrous. *Capsules* sub-globose, 4-celled, equally spinous on all sides, irregularly dehiscent

near apex, supported by the persistent base of calyx; 1·25 to 1·5 in. in diam. *Seeds* .25 in. diam.

*VAR. typica*; corolla purple. *D. fastuosa*, Linn. Syst. ed. X. 932; Roxb. Flor. Ind. I. 561; Wall. Cat. 2638; Nees in Trans. Linn. Soc. XVII. 74; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 669; Clarke in Hook. f. Flor. Brit. Ind. IV. 242. *D. Hummatus*, Bernh. in Linn. Litteraturber. (1883) 141.

*VAR. alba*, Clarke in Flor. Brit. Ind. IV. 243; corolla white or cream-coloured. *D. alba*, Nees in Trans. Linn. Soc. XVII. 73; Wight Ic. t. 852; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 667. *D. Metel*, Roxb. Flor. Ind. I. 561; Wall. Cat. 2639 (not of Linn.).

PERAK: Larut, *Scortechinus*! Ulu Bubong, *King's Collector*! SINGAPORE: *Hullett*!—DISTRIB. Tropical Africa, S.E. Asia.

The purple-flowered variety has not been sent to Calcutta from any of the provinces. Kunstler says that the white one is "not native" in Perak.

## 5. NICOTIANA, Linn.

Erect, viscid-pubescent herbs, shrubs, or trees. *Leaves* entire or sinuate. *Racemes* paniculate, terminal or sub-terminal. *Calyx* tubular or ovoid, 5-fid. *Corolla* funnel-shaped; lobes 5, induplicate in bud. *Stamens* attached to lower part of corolla-tube, filaments filiform; anthers ovate, dehiscing longitudinally. *Ovary* 2-celled; style filiform; stigma shortly 2-fid. *Fruit* a capsule, 2-celled, or rarely spuriously almost 4-celled; valves separating to their middle, often again splitting. *Seeds* very many, small, scarcely compressed, embryo nearly straight. —DISTRIB. Species about 35; American, Australian, Polynesian.

*NICOTIANA TABACUM*, Linn. Sp. Pl. 180. A herb 2 to 3 feet high branching upwards, all parts glandular-pubescent. *Leaves* large, sessile or sub-amplexicaul, ovate-lanceolate, acute, the lower decurrent; 4 to 8 in. (the lower sometimes 12 to 15 in. long) by 2 to 3 in. across; tapering to the cuneate base. *Flowers* large, in compound corymbs with short ultimate bracteate branchlets. *Calyx* campanulate, 5 in. long, .3 in. wide, teeth 5, triangular-lanceolate, .2 in. long. *Corolla* pink or pale-rose, linear-funnel-shaped, 1·75 to 2 in. long, limb 1 in. across, lobes spreading ovate, sub-acuminate. *Capsule* ovate, .75 in. long, .5 in. in diam., slightly exceeding calyx. *Seeds* small. Gaertn. Fruct. I. 264, t. 55; Lamk. Ill. t. 113. Dun. in DC. Prod. XIII. 557; Miq. Flor. Ind. Bat. II. 670; Clarke in Hook. f. Flor. Brit. Ind. IV. 245.

In all the provinces, cultivated.

A native of America, cultivated in all warm countries. The common Tobacco.

Order LXXXIII. SCROPHULARIACEÆ.

[By D. PRAIN ]

Herbs or shrubs, occasionally epiphytic, sometimes semi-parasitic. *Leaves* all or only the lower opposite, rarely all alternate or whorled, occasionally all radical, sub-rosulate; stipules 0. *Flowers* hermaphrodite, usually irregular; inflorescence centripetal or composite. *Calyx* inferior, 5-, rarely 4-lobed or -partite. *Corolla* hypogynous, more or less 2-lipped or occasionally personate; upper lip entire or 2-lobed, lower 3-lobed. *Stamens* epipetalous, usually 4, didynamous or rarely sub-equal, occasionally only 2, very rarely 5; anthers 2-celled, cells distinct or apically or entirely confluent, or 1-celled by abortion, often when stamens didynamous with anthers connivent and sometimes with their apices connate in a posterior and an anterior pair. *Disk* annular, cupular, or glandular. *Ovary* superior, 2-celled; ovules usually numerous in each cell, anatropous or amphitropous; style simple; stigma capitate or dilated, simple; occasionally 2-lobed or 2-lamellate. *Fruit* usually a capsule, rarely a berry; placentas sometimes persistent on a central axis, at others attached to margins of valves. *Seeds* small with a lateral or ventral hilum; albumen fleshy, rarely absent; embryo straight or curved.—DISTRIB. Species 2,000 or more, in all regions.

*Angelonia grandiflora*, C. Morr., an American species, has become naturalised as an escape from gardens in Selangor (*Goodenough* in Herb Ridley 10486); it has long been similarly naturalised in Tenasserim and the Irawadi Delta, and has more recently become established in the Gangetic Delta.

Corolla with upper lip or two upper lobes outmost in bud.—

Stamens 4, fertile.—

All 4 filaments inserted within corolla-tube.—

Trees or epiphytes .. .. 1. WIGHTIA.

Herbs —

Throat of corolla plicate, forming a 2-lobed palate; anther-cells contiguous, divaricate .. .. 2. MAZUS.

Throat of corolla not plicate:—

Anther-cells discrete, stipitate; corolla distinctly 2-lipped.—

Upper lobe of calyx distinctly exceeding the others; 2 or sometimes all the anthers with one cell imperfect 3. ADENOSMA.

Upper lobe of calyx hardly if at all exceeding the others, all 4 stamens with perfect anthers .. 4. LIMNOPHILA.

Anther-cells contiguous; lateral calyx-lobes much narrower than the other three; corolla sub-equally 5-lobed .. .. 5. HERPESTIS.

Only 2 posterior filaments inserted within corolla-tube; the anterior pair inserted on corolla-throat —

Calyx with 3 to 5 distinct ridges or wings .. .. 6. TORENIA.

- Calyx without wings or ridges :—**
- |                             |               |
|-----------------------------|---------------|
| Calyx-segments narrow .. .. | 7. VANDELLIA. |
| Calyx-segments broad .. ..  | 8. ARTANEMA.  |
- Stamens only 2 posterior fertile, inserted within corolla-tube ; anterior pair reduced to staminodes on corolla-throat :—**
- |   |              |
|---|--------------|
| Calyx 4-lobed, the outer lobes very broad .. .. | 9. CURANGA.  |
| Calyx 5-lobed, the lobes all narrow .. ..       | 10. BONNAYA. |
- Corolla with upper lip or 2 upper lobes inmost in bud ; rarely lobes imbricate :—**
- |  |                   |
|--|-------------------|
| Corolla-tube very short ; lobes 4, sub-equal, imbricate ; stamens 4, sub-equal .. .. | 11. SCOPARIA.     |
| Corolla-tube elongated ; lobes 5, 2-labiate —  |                   |
| Calyx tubular, 5-lobed .. ..   | 12. STRIGA.       |
| Calyx spathaceous, split in front .. ..  | 13. CENTRANTHERA. |

### 1. WIGHTIA, Wall.

Large epiphytic climbers, eventually becoming trees. *Leaves* mostly or all opposite, quite entire, coriaceous. *Flowers* in usually axillary, often thyrsoid racemes, large, rosy or purple, pubescent. *Calyx* campanulate, irregularly 3-5-lobed. *Corolla-tube* incurved, upper lip erect, 2-lobed, lower spreading, 3-fid. *Stamens* 4, didynamous, ascending, exserted ; anthers oblong, sagittate, cells parallel. *Style* long, tip incurved, stigma simple. *Capsule* oblong-ovoid, septicidal, many-seeded, valves long, separating from the placentiferous axis, which is 2-partite or entire. *Seeds* linear, ascending, nucleus slender, testa membranous, broadly winged all round ; albumen 0 ; embryo straight. —**DISTRIB.** Species 3, all S E. Asiatic.

The species of this genus exhibit the primarily epiphytic but subsequently arboreal habit characteristic of many species of *Ficus*. Though often loosely spoken of as parasites, and though, as a matter of fact, they frequently strangle the trees on which they become established, epiphytes of this class are not parasites in the physiological

**WIGHTIA BORNEENSIS**, Hook. f in Ic Plant. XV 35, t. 1444 (1883). A tree, 20 feet in height and upwards, commencing life as an epiphyte and flowering most freely in that condition. *Leaves* opposite, thinly coriaceous, glabrous as are the lenticellate branchlets, drying brown, margin entire, outline elliptic, apex obtusely acuminate, base cuneate, narrowed to the petiole, main-nerves 2-3-jugate ; length 3 to 4 in., breadth 1.25 to 1.75 in., petiole .75 in. long. *Flowers* opposite or whorled on the rachis of axillary or terminal racemes, pedicels slender, rigid, spreading, 5 in. long, rachis stout, glabrous, erect, 6-10-flowered, 3 to 6 in. long. *Calyx* campanulate, margin entire, .4 in. across. *Corolla* trumpet-shaped, incurved, purple, densely beset with a fine stellate tomentum, 2 in. long, lobes rounded, throat slightly enlarged. *Stamens* inserted near base of corolla ; filaments slender, far-exserted ;

anthers sagittate. Ovary glabrous; style filiform; stigma simple. Fruit not seen.

PERAK: Larut Hill at 3,000 feet, Derry (Herb. Curtis, n. 3710) !—  
DISTRIB. Borneo.

The solitary Perak specimen agrees well with a specimen from Borneo in Herb. Kew; as our Perak example is destitute of leaves the description of these is based on a second Bornean example of the plant. The species is most readily distinguished from the other two known species by its entire calyx-limb

## 2. MAZUS, Lour.

Small herbs, often surculose. Leaves rosulate or opposite below, opposite or alternate above. Flowers in terminal, sub-second racemes; bracts minute or 0; bracteoles 0. Calyx campanulate, 5-fid; lobes large, leafy. Corolla 2-lipped; tube short, upper lip erect, ovate, 2-fid; lower longer, spreading, 3-fid; throat with a 2-lobed palate. Stamens 4, didynamous; anther-cells contiguous, divaricate. Ovary 2-celled; style short; stigma 2-lamellate; ovules numerous. Capsule globose or compressed, loculicidal, 2-valved, included. Seeds many, ovoid, very minute.—DISTRIB. Species about 5, Asiatic and Australian.

MAZUS RUGOSUS, Lour. Flor. Cochín-Chin. 385. A small annual glabrous or sparingly hirsute herb. Leaves many, radical, obovate-spathulate, irregularly coarsely crenate, narrowed to a short petiole, .75 to 3 in. long. Scapes numerous from the root, 2 to 10 in. long, leafless or with a few alternate spathulate leaves, with terminal racemes 1 to 6 in. long, the pedicels slender, .25 to .5 in. long, usually without bracteoles. Calyx campanulate, .25 in. long, lobes ovate-lanceolate, acute, half as long as tube, spreading in fruit. Corolla pale blue, .3 in. long. Capsule .2 in. long, included in the calyx; calyx-mouth in front .3 to .5 in. across. Seeds very minute; testa pale straw-coloured. Benth in DC. Prod. X. 375; Boiss. Fl. Orient. IV. 424; Miq. Flor. Ind. Bat. II. 677; Hook. f. Flor. Brit. Ind. IV. 259. *M. bicolor*, Benth. in Wall. Cat. 3913. *M. vandellhordes*, Hance in Walp. Ann. III. 193. *Lindernia japonica*, Thunb. Flor. Japon. 253. *Hornemannia bicolor*, Willd. Enum. Hort. Berol. 654; Reichb. Icon. Exot. 25, t. 37. *Columnea tomentosa*, Roxb. Flor. Ind. III. 98. *Stemodia tomentosa*, G. Don Gen. Syst. Gard. IV. 842. *Tittmannia obovata*, Bunge Enum. Pl. Chin. 279. *Vandellia obovata*, Walp. Act. Acad. Leopold. XIX., Suppl. I. 394. *Gratiola goodenæfolia*, Hornem. Hort. Hafn.

SINGAPORE: a garden weed, Ridley !—DISTRIB. E. and S.E. Asia generally.

## 3. ADENOSMA, R. Br.

Annual, villous or glandular aromatic herbs. Leaves opposite, rugose, crenulate. Flowers axillary or in leafy spikes, racemes or

heads; bracteoles conspicuous or absent. *Calyx* deeply 5-lobed; lobes imbricate, the upper the largest; sometimes in fruit all enlarged. *Corolla* 2-lipped; upper lip erect, entire or notched, outmost in bud; lower 3-lobed, spreading; throat not plicate; tube cylindric. *Stamens* 4, didynamous, included; anther-cells discrete, stipitate, one cell of each anterior stamen or of all four stamens empty. *Ovary* 2-celled; ovules in each cell numerous, style filiform below, winged upwards under the entire or 2-lamellate stigma. *Fruit* an ovoid, ellipsoid, or lanceolate 2-grooved and 4-valved capsule, opening both loculicidally and septiciidally. *Seeds* many, minute, reticulate.—**DISTRIB.** Species about 10, in S.E. Asia and Australia.

Flowers axillary; outer fruiting sepals enlarged:—

Leaves ovate-obtuse, crenate-serrate .. ..	1. <i>A. ovatum</i> .
Leaves ovate-acute, serrate .. ..	2 <i>A. inopinatum</i> .

Flowers in terminal heads, spikes or racemes; sepals little altered.—

Bracts linear, hardly exceeding the calyx.—

Spikes short, dense, cylindric or capitate .. ..	3. <i>A. capitatum</i> .
Spikes long, slender .. ..	4. <i>A. cœruleum</i> .
Bracts leafy, elliptic, acute, longer than calyx .. ..	5. <i>A. hirsutum</i> .

1. *ADENOSMA OVATUM*, Benth in Hook. fil. Flor. Brit. Ind. IV. 263, A puberulous or glabrate herb, branched from the base, branches rooting below, prostrate or ascending, 6 to 18 in. long. *Leaves* ovate-obtuse, crenate-serrate, base wide-cuneate, rounded or truncate; blade .75 in. long, .5 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than the calyx. *Calyx* of 5 almost free sepals, in flower herbaceous, sub-equal, in fruit membranous, reticulate, pubescent, the 3 outer enlarged, .35 in. wide, ovate-cordate, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones. *Herpestis ovata*, Benth Scroph. Ind 30; Wall. Cat. 3896. *H. javanica*, Bl. Bijar. 748. *Pterostigma ovatum*, Benth. in DC. Prod. X. 380; Miq. Flor. Ind. Bat II. 678

PERAK: Gunong Tundul, *Ridley* 9444! PENANG: Waterfall, *Curtis*! MALACCA: *Griffith*! SINGAPORE Bukit Timah, *Ridley* 6894! "a garden weed," *Ridley* 8910!—**DISTRIB.** Indo-China, Malay Archipelago.

2 *ADENOSMA INOPINATUM*, Prain Journ. As. Soc Beng. LXXII. 2, 16. A pubescent herb, branched from the base, branches rooting below, ascending, 6 to 18 in. long. *Leaves* ovate-acute, serrate, base cuneate; blade 1 to 1.5 in. long, .75 to 1 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than calyx. *Calyx*

of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, the 3 outer enlarged, .25 in. wide, ovate-lanceolate with truncate bases, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones.

MALACCA: *Griffith*! SINGAPORE: *Anderson*! *King's Collector*!

Very nearly allied to *A. ovatum*, Benth., and *A. subrepens*, Benth. It differs from both by its acute leaves, but except in this respect and as regards its distribution it is hardly separable from *A. subrepens* of Ceylon. From *A. ovatum* of Tenasserim, with which it has been confused, it further differs in its larger size, coarser habit of growth, and much narrower outer sepals. It has also been confused with *A. cæruleum*, from which it differs by its flowers being all axillary and by its enlarged fruiting sepals.

3. *ADENOSMA CAPITATUM*, Benth. in Hook. f. Flor. Brit. Ind. IV. 264. A stout, erect, glandular-villous herb, 1 to 2 feet high. *Leaves* ovate or oblong, sub-acute, serrate, often reflexed; base cuneate; blade 1 to 2 in. long, .5 to .75 in. wide, petiole very short. *Flowers* in dense cylindrical or globose terminal or axillary heads, with basal involucre of floral leaves; peduncles 1 in. or less, sometimes in the lower clusters sub-obsolete and the flowers in axillary whorls; heads usually .5 in. across, sometimes longer up to 4 in. long, bracts linear, hardly exceeding the sepals. *Calyx* of 5 almost free sepals, villous with long hairs, .25 in. long, the uppermost ovate-lanceolate, broader than the other lanceolate. *Corolla* blue. *Capsule* ovoid, .2 in long *Stemodia capitata*, Benth. in Bot. Reg. under t. 1470; Wall. Cat. 3926. *Pterostigma spicatum*, Benth. Scroph. Ind. 21. *P. capitatum*, Benth. Scroph. Ind. 31, and in DC. Prod. X. 380 *Erinus bilabiatus*, Roxb. Fl. Ind. III. 92.

PROV. WELLESLEY *King*! *King's Collector*. PENANG: *Wallich*; *Deschamps*! *Curtis*! SINGAPORE: *King*! *Ridley*! MALACCA: *Cuming*! Ayer Keroh, *Ridley*! *Griffith*; *Wallich*. NEGRI SEMBILAN: *Kuala Pedas*, *Ridley*! PAHANG: *Ridley*!—DISTRIB. Throughout S.E. Asia.

4. *ADENOSMA CÆRULEUM*, R. Br. Prod. 443. An erect herb, 1 to 2 feet high, viscidly pubescent. *Leaves* ovate-acute, crenate, base rounded or cordate; blade 1.5 to 2.5 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* in long slender strict spikes; bracts lanceolate, about as long as calyx. *Calyx* of 5 almost free sepals, the upper lanceolate the rest linear, not very greatly altered in fruit. *Corolla* blue. *Capsule* lanceolate, rather longer than the sepals. Benth. Flor. Austral. IV. 484; Hook. f. Flor. Brit. Ind. IV. 263. *Pterostigma villosum*, Benth. Scroph. Ind. 21, and in DC. Prod. X. 380 partly; Miq. Flor. Ind. Bat. II. 678. *P. strictum*, Griff. Not. IV. 96, Ic. Pl. Asiatic. t. 417, f. 3. *Stemodia cærulea*, Benth. in DC. Prod. X. 381. *Herpestis lanuginosa*, Bl. Bijdr. 747.



SELANGOR: *Ridley* ! PERAK: *Scortechini* ! WRAY! MALACCA: *Griffith* ! *Cuming* ! *Manngay* ; *Hervey* ! SINGAPORE: *Cuming* ! *Wallich*.  
—DISTRIB. Indo-China, Malaya, Australia.

*Scortechini* notes on this, "aromatic; most likely introduced." It appears, however, to be native.

5. *ADENOSMA HIRSUTUM*, Kurz Journ. As. Soc. Beng. XLV. 2. 143. A stout, erect, villous herb, 2 to 3 feet high. *Leaves* ovate or elliptic, sub-acute, serrate, base cuneate; blade 1 to 2 in. long, .5 to .75 in. wide; petiole very short or 0. *Flowers* in dense cylindric or oblong heads, often ternate, usually peduncled, with closely imbricate hirsute leafy bracts; peduncles sometimes 1.5 in. long, heads 1 to 3 in. long, .75 to 1 in. wide; bracts ovate-acute, serrate, .4 to .6 in. long. *Calyx* of 5 almost free villous linear sepals, .25 in. long. *Corolla* blue. *Cap-sule* ovate, abruptly beaked, as long as calyx. *Pterostigma hirsutum*, Miq. Flor. Ind. Bat. Suppl. 562. *P. villosum*, Miq. l.c. (not of Benth.).

PROVINCE WELLESLEY: *Curtis* 2238 ! *Ridley* 6977 ! NICOBARS: *Kamorta*, Kurz !—DISTRIB. Sumatra (*Teysmann* 1157), Bangka (*Teysmann* 3429), Borneo (*Motley*, n. 215).

A coarser plant than *A. capitatum*, with leafy bracts throughout the spikes

#### 4 LIMNOPHILA, R. Br.

Herbs of marshes and pools, glabrous or pubescent, aromatic. *Leaves* with transparent dots, opposite or whorled, toothed or cut, when submerged frequently lacinate-multifid. *Flowers* solitary axillary, sessile or pedicelled, or passing into terminal spikes or racemes; bracts leafy; bracteoles small or obsolete. *Calyx* 5-partite; lobes narrow, imbricate, all equal or the upper largest. *Corolla* 2-labiate; upper lip outmost, sub-erect, entire or 2-fid; lower spreading, 3-lobed; throat not plicate; tube cylindric. *Stamens* 4, didynamous, included; anther-cells all perfect, usually discrete, stipitate, occasionally contiguous. *Ovary* 2-celled; ovules in each cell numerous; style slender, with deflexed tip and 2-lamellate stigma. *Fruit* an ovoid or oblong capsular, with both septicial and loculicidal dehiscence, the placentiferous septum separating from the valves. *Seeds* many, minute, angular and truncate, reticulate.—DISTRIB. Species about 25, in the tropics of the Eastern Hemisphere and Australia.

*Leaves* never pinnatifid above, very rarely so even on lower portion of stem.—

*Flowers* sessile:—

*Leaves* at least 1 in. long:—

*Leaves* petioled, 2 to 3 in. long, pubescent or glabrous .. 1. *L. Roxburghii*.

- Leaves sessile, 1 to 2 in. long, softly pubescent .. 2. *L. balsamea*.  
 Leaves glabrous, never exceeding .5 in. long .. 3. *L. micrantha*.  
 Flowers pedicelled :—  
 Leaves hirsute :—  
 Leaves usually opposite, rarely 3-nate, never more than .75 in. long ; flowers always axillary, solitary .. 4. *L. villosa*.  
 Leaves usually 3-4-nately whorled, rarely opposite, never less than 1.5 in. long ; flowers usually cymose or paniculate, rarely axillary, solitary .. 5. *L. hirsuta*.  
 Leaves glabrous :—  
 Leaves cuneate at base, always opposite ; flowers axillary, solitary —  
 Stems creeping ; branches many, divaricate ; pedicels in fruit erect .. 6. *L. pygmaea*.  
 Stems erect, usually simple ; pedicels in fruit recurved .. 7. *L. erecta*.  
 Leaves half-amplexicaul at base, often 3-4-nately whorled, flowers usually in many-flowered racemes, rarely axillary, solitary .. 8. *L. gratissima*.  
 Leaves mostly or all lobulate or pinnatisect, or capillary multifid :—  
 Flowers sessile or shortly pedicelled ; uppermost leaves entire :—  
 Flowers all solitary .. 9. *L. sessiliflora*.  
 Flowers passing into a terminal spike .. 10. *L. heterophylla*,  
 VAR. *reflexa*.  
 Flowers all pedicelled, the pedicels exceeding the calyx, all the leaves capillary multifid .. 11. *L. Griffithii*.

1. LIMNOPHILA ROXBURGHII, G. Don Gen. Syst. IV. 543 (not of Benth). A stout glabrous or pubescent aromatic herb, with a creeping rootstock and with decumbent rooting base, giving off numerous erect stems 1 to 2 feet high. Leaves opposite, petioled, elliptic or ovate, obtuse or sub-acute, margin crenulate, base cuneate, punctate beneath, nerves distinct, 8 to 10 pairs, length up to 4 in., width to 2 in. ; petiole .75 in. Flowers sessile, in axillary peduncled heads, rarely solitary. Calyx hirsute, .2 in. long ; lobes lanceolate, finely acuminate in fruit, not striate. Corolla .35 in. long, purplish-blue with a yellow throat. Capsule .2 in. long, elliptic, sub-acute. Hook. f. Flor. Brit. Ind. IV. 265. *L. Menthastrum*, Benth. in DC. Prod. X. 386 ; Maxim. Mel. Biol. IX. 406. *Herpestis rugosa*, Roth Nov. Sp. 290. *Capraria gratissima*, Roxb. Fl. Ind. III. 92 (in part). *Stemodia Menthastrum*, Benth. Scroph. Ind. 23, Wall. Cat. 3927. *Adenosma triflora*, Seem. Fl. Vit. 184 (not of Nees). *Eclipta scabriuscula*, Wall. Cat. 3212.

KEDAH : Langkawi, at Coah, Curtis 2556 !—DISTRIB. Himalaya, from Chamba eastward, N. and C. India, Indo-China, Philippines, China.

The bases of the stems are often submerged, and besides the fibrous roots then emitted the lower nodes at times have multifid submerged leaves. The plant smells strongly of Aniseed.

2. *LIMNOPHILA BALSAMEA*, Benth. in DC. Prod. X. 386. A stoutish, softly pubescent herb; stem 1 to 2 feet high. *Leaves* opposite, elliptic, sub-acute, narrowed from the middle to the base with margin entire, beyond the middle obscurely crenulate, punctate beneath, nerves slender, 3 to 5 pairs; length up to 2 in., width to 1 in.; petiole 0. *Flowers* in short peduncled axillary heads or spikes. *Calyx* hirsute, .15 in. long; lobes lanceolate, finely acuminate; in fruit striate. *Corolla* .35 in. long. *Capsule* .2 in. long, broadly elliptic, obtuse. Hook. f. Flor. Brit. Ind. IV. 266. *Stemodia balsamea*, Benth. Scroph. Ind. 23; Wall. Cat. 3928.

PERAK: *King's Collector* 1027!—DISTRIB. Indo-China

3. *LIMNOPHILA MICRANTHA*, Benth in DC Prod. X. 387. A small, stoutish, glabrous herb, creeping below; stem 3 to 6 in. long, branching from the base. *Leaves* all opposite, crowded, thick, 25 to .45 in long, margin entire or very sparingly sub-serrate, punctate beneath, nerves obscure; petiole 0. *Flowers* axillary, sub-sessile, small. *Calyx* .06 in. long, glabrous; lobes subulate, in fruit striate. *Corolla* reddish-purple, .12 in. long. *Capsule* ovate, .08 in. long. Hook f. Flor Brit. Ind. IV. 267. *Stemodia micrantha*, Benth. Scroph. Ind. 23; Wall. Cat 3936. *Herpestis pygmaea*, Griff. Notul. IV. 104.

PAHANG. *Ridley*!—DISTRIB. Indo-China, Bengal.

4. *LIMNOPHILA VILLOSA*, Bl. Bijdr 750. An erect or spreading, sub-simple, stoutish or slender, pubescent herb, stems 4 to 6 in. high. *Leaves* opposite, elliptic-oblong, sub-crenate, 5 to .75 in. long, punctate beneath, nerves obscure; petiole 0. *Flowers* axillary, solitary, on short pubescent pedicels, .15 in. long, erect in fruit. *Calyx* hirsute, .15 in long, lobes lanceolate, acuminate-subulate, in fruit striate. *Corolla* .2 in. long. *Capsule* 15 in long, ovate. Benth. in DC Prod. X. 388; Miq. Flor. Ind. Bat. II 681. *L. laxa*, Benth in DC Prod. X. 388 partly. *L. pulcherrima*, Hook f Flor Brit. Ind IV 267 *Herpestis pulcherrima*, Griff. Notul IV 104

PERAK: *Wray* 788! MALACCA *Griffith*! *Cuming*! *Maingay*! *Ridley*! *Hervey*! PENANG: *Tulloch Bahang, Curtis*! *Ridley* 7104! PAHANG: *Ridley*! SINGAPORE. *King's Collector*! *Hullett*! *Deschamps*! *Kurz*! *Ridley*! PROVINCE WELLESLEY. *King*! SALAMA: *Scortechini*! —DISTRIB. Sumatra, Java.

5. *LIMNOPHILA HIRSUTA*, Benth. in DC Prod X. 388 An erect hirsute herb; stem 6 to 8 in. high. *Leaves* opposite or 3-4-nately whorled, elliptic, linear-oblong or sub-spathulate, 1.5 to 2.5 in. long, apex obtuse, margin serrulate, punctate beneath, nerves few, very indistinct; petiole short or obsolete. *Flowers* axillary, solitary or cymose or paniculate at the apex of the stem; pedicels .2 to .75 in.

bracteoles minute. *Calyx* .3 in. long, hirsute; lobes lanceolate, finely acuminate, in fruit striate. *Corolla* .5 in. long. *Capsule* sub-orbicular, .25 in. long. Hook. f. Flor. Brit. Ind. IV. 268. *L. javanica*, A. DC. in DC. Prod. X. 594 *Stemodia hirsuta*, Heyne, ex Wall. in Cat. 3930; Benth. Scroph. Ind. 24. *Ambulia ebracteata*, Ham ex Hook. f. Flor. Brit. Ind. IV. 268.

NICOBARS: *Kurz*! PERAK: *Scortechini*! *Kunstler*! MALACCA: *Ridley*!—DISTRIB. India, Indo-China, Malay Archipelago, China.

6. LIMNOPHILA PYGMÆA, Hook f. Flor Brit. Ind IV. 268 A very small, glabrous, much-branched creeping herb, branches 4 to 6 in. long, divaricate. *Leaves* opposite, .3 to 4 in. long, oblong-lanceolate, apex acute, margin sub-serrate; punctate beneath, nerves very obscure, petiole 0. *Flowers* axillary, solitary, pedicels slender, .15 to .2 in. long, erect in fruit. *Calyx* .15 in. long, hirsute, lobes subulate-lanceolate, striate in fruit. *Corolla* .2 in. long. *Capsule* .15 in., ovate. *Herpestis pygmæa*, Griff Notul. IV. 104. *Stemodia diffusa*, Benth. in Wall Cat 3937.

MALACCA: *Griffith*! *Cuming*!—DISTRIB. Tenasserim.

7. LIMNOPHILA ERECTA, Benth. in DC Prod. X. 388. An erect, sub-simple or branched, stoutish glabrous herb, stems 4 to 8 in. high. *Leaves* all opposite, linear-oblong, 5 to 1 in. long, apex acute, margin sub-serrate except the narrow cuneate base, punctate beneath, nerves obscure, petiole very short or obsolete. *Flowers* white, axillary, solitary, on short pedicels, .1 in. long, recurved in fruit. *Calyx* glabrous, .15 in. long, lobes lanceolate, acuminate, in fruit striate. *Corolla* .2 in. long. *Capsule* 15 in. long, ovate. Maxim. Mel. Biol IX. 406, Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia gratioloides*, Benth. Scroph. Ind 25, Wall. Cat. 3938.

PERAK: *Scortechini*! *Wray*! *King's Collector*! NEGRI SEMBILAN: *Ridley*! SELANGOR: *Ridley*! PAHANG *Ridley*!—DISTRIB. Indo-China, Bengal, S. China.

8. LIMNOPHILA GRATISSIMA, Bl. Bijdr. 749. An erect, glabrous herb with a stout stem, 1 to 2 feet high, simple or occasionally branched above. *Leaves* opposite and ternate, half-amplexicaul, linear-oblong, 1.5 to 2.5 in. long, apex sub-acute, margin serrulate, punctate beneath, nerves few, indistinct; petiole 0. *Flowers* in axillary and terminal many-flowered racemes, rarely flowers axillary solitary, sometimes the racemes 12 in long and paniculately branched with the flowers whorled, at others the racemes reduced, pedicels .5 to 1 in. long, glandular; bracteoles minute. *Calyx* .3 in. long, glabrate, lobes lanceolate-acuminate; in fruit calyx hemispherical with lobes striate. *Corolla* 5 in. long. *Capsule* oblong, acute, .3 in. long. Benth. Scroph. Ind. 26;

Wall. Cat. 3906; Hook. f. Flor. Brit. Ind. IV. 268. *L. punctata*, Bl. Bijdr. 750; Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 682; Maxim. Mel. Biol. IX. 406. *Gratiola aromatica*, Pers. Synops. I. 14. *Ambulia aromatica*, Lamk. Encycl. Meth. I. 128. Rheed. Hort. Malab. X. 6.

MALACCA: *Griffith*. PERAK: *King's Collector! Wray!*—DISTRIB. S.E. Asia generally, N. Australia.

9. *LIMNOPHILA SESSIFLORA*, Blume Bijdr. 750. A hirsute or rarely glabrate herb; stem stoutish, 4 to 8 in. long. *Leaves* 3 to 6 in a whorl throughout all lobulate or pinnatisect, or the uppermost very rarely opposite entire, usually about 4 to 5 in. long. *Flowers* axillary solitary, sessile or shortly pedicelled. *Calyx* 3 in. long, lobes ovate-acuminate, tube in fruit membranous, hemispheric, not striate. *Corolla* 5 in. long. *Capsule* orbicular, turgid, 2 in. across. Benth. Scroph. Ind. 25, Wall. Cat. 3902; DC. Prod. X. 389; Miq. Flor. Ind. Bat. II. 683, Hook. f. Flor. Brit. Ind. IV. 270. *Hottoma sessiflora*, Vahl Symb. II. 36.

KEDAH: Langkawi, in swamps, *Curtis!*—DISTRIB. Throughout S.E. Asia.

10. *LIMNOPHILA HETEROPHYLLA*, Benth.; var. *reflexa*, Hook. f. Flor. Brit. Ind. IV. 270. A glabrous herb with a very slender elongated stem, 1 to 1.5 feet long. *Leaves* towards apex of stem usually opposite, small, rarely over 2.5 in. long, sessile, half-amplexicaul, oblong, margin crenulate; followed by pinnatifid leaves 4 to 6 in a whorl, 5 in. long; with below these submerged whorled and very finely capillary-multifid leaves, 5 in. long. *Flowers* axillary solitary, the upper sub-sessile passing into a short leafy spike, the lower pedicelled, with pedicels recurved in fruit and longer than the calyx. *Calyx* 2.5 in. long, lobes ovate, very shortly acuminate, in fruit not at all striate, tube in fruit hemispheric, membranous. *Corolla* 4 in. long. *Capsule* sub-globose, 3 in. long. *L. reflexa*, Benth. Scroph. Ind. 25; DC. Prod. X. 389; Wall. Cat. 3904.

MALACCA. *Cuming*. KEDAH: *Curtis* 2103!—DISTRIB. (of variety,) Tenasserim: (of type,) throughout S.E. Asia.

This variety differs from the type in having distinctly shorter submerged leaves, and distinctly longer pedicels to the lower flowers.

11. *LIMNOPHILA GRIFFITHII*, Hook. f. Flor. Brit. Ind. IV. 271. A very small herb with creeping tufted stems, sending down long rigid roots and emitting many erect branches, 1 to 2 in. long, sometimes stout and stiff, sometimes slender and flaccid. *Leaves* 2.5 to 3.5 in. long, usually densely whorled and imbricated, multifid. *Flowers* axillary solitary, on slender pedicels, 3.5 to 5 in. long, that are deflexed

in fruit. *Calyx* .1 in. long, teeth short. *Corolla* pure white, .4 in. long. *L. sessiliflora*, Griff. Notul. IV. 99, t. 418, f. 5 (not of Bl.). *L. gratio-  
loides* var. *myriophylloides*, Benth. in DC Prod. X. 389 partly. *Quin-  
quelobus glaber*, Benj. in Linnæa XX 316. *Benjaminea glabra*, Benj.  
in Linnæa XX. 761.

MALACCA: Griffith! Leman, Cuming! Maingay! PERAK: King's  
Collector!

Griffith's specimens have slightly larger leaf-segments and shorter pedicels than those of Maingay, Cuming, and Kunstler, where the leaf-segments are finely capillary. But Griffith's plant evidently grew on mud, while that of Kunstler was floating in water, and the difference of habitat probably sufficiently explains the difference in foliage. The flowers of the two forms are the same.

### 5. HERPESTIS, Gaertn. f.

Herbs, glabrous. *Leaves* often dotted, entire or toothed, or below submerged and multifid. *Flowers* axillary or racemose, bracteoles small or obsolete. *Calyx* 5-partite; lobes imbricate, the upper largest, the two lateral inmost often very narrow. *Corolla* indistinctly 2-lipped; upper lip outmost spreading, 2-lobed or only emarginate, lower 3-lobed, tube cylindric. *Stamens* 4, didynamous, included; anthers sometimes approximate in pairs; cells contiguous, parallel, not confluent. *Ovary* 2-celled; ovules in each cell numerous; style dilated at the top; stigma entire or 2-lobed. *Fruit* a globose or ovoid 2-celled capsule; valves 2 or 4, separating from the placentiferous septum. *Seeds* many, very minute.—DISTRIB. Species about 50, throughout the tropics.

HERPESTIS MONNIERIA, H B. & K Nov. Gen. and Sp. II. 366. A glabrous, rather succulent creeping herb, rooting at the nodes; branches 4 to 10 in. long. *Leaves* obovate-oblong, spatulate, sessile, obtuse, entire, .5 to .75 in. long. *Flowers* axillary, peduncles usually .75 to 1 in. long, bracteoles 2. *Calyx* of 5 nearly free sepals, .2 to .3 in. long, the upper sepal ovate. *Corolla* white, faintly tinged with blue, .4 to .6 in. long, lobes sub-equal. *Capsule* ovoid, acute, hidden by the sepals, .15 to .25 in. long. *Seeds* minute, irregular; testa pale. Benth. Scroph. Ind. 30, and in DC. Prod. X. 410; Wall. Cat. 3900; Dalz. & Gibs. Bomb. Flor. 178, Miq. Flor. Ind. Bat. II. 685; Bot. Mag. t. 2557, Boiss. Flor. Orient. IV. 426; Hook f. Flor. Brit. Ind. IV. 272. *H. spatulata*, Bl. Bijdr. 748. *Gratiola Monnieria*, Linn. Cent. Pl. II. n. 120; Roxb. Cor. Pl. II. 41, t. 178, and Flor. Ind. I. 141. *Septs repens*, Lour. Flor. Cochinchina. 392. *Bramia indica*, Lamk. Encyc. I. 459. Rheed. Hort. Malab. X. t. 14

MALACCA: Hervey! JOHORE: Hullett! SINGAPORE: Kurz! Rid-  
ley!—DISTRIB. Throughout the tropics.

## 6. TORENIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, entire or crenate or serrate. *Flowers* often showy, axillary, or in terminal or pseudo-axillary racemes or umbels; bracteoles 0. *Calyx* 2-lipped or 3-5-toothed, 3-5-keeled or -winged or -folded. *Corolla* 2-lipped; upper lip outmost erect, concave or pinched, notched or 2-fid; lower larger spreading, 3-lobed; tube cylindric, somewhat curved, dilated upwards. *Stamens* 4, didynamous; upper pair included inserted on corolla-tube; lower inserted on throat, appendaged or not at base, and connivent under upper lip; anthers contiguous or connate in pairs, cells often confluent. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a linear or oblong, included septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, rugose or cancellate.—DISTRIB. Species 20, Tropical Asiatic and African, one American.

*Calyx* very distinctly winged —

Fruiting calyx sub-orbicular, as broad as long; stems prostrate and rooting .. .. 1 *T. polygonoides*.

Fruiting calyx longer than broad; stems erect —

Wings broad distinctly decurrent on the pedicels; corolla very little exserted, bracteoles very small, pedicels shorter than the calyx .. .. 2. *T. peduncularis*.

Wings narrow hardly decurrent on the pedicels, corolla distinctly exserted; bracteoles large, pedicels as long as or longer than the calyx .. .. 3 *T. ciliata*.

*Calyx* hardly or not at all winged —

Flowers all axillary.—

Stems and leaves glabrous; calyx deeply lobed, faintly winged .. .. 4. *T. asiatica*

Stems and leaves hirsute; calyx wingless, shortly lobed .. 5 *T. Benthamiana*.

Flowers in terminal racemes, stems and leaves hirsute, calyx wingless, shortly lobed .. .. 6 *T. flava*.

1 TORENIA POLYGONOIDES, Benth. Scroph. Ind. 39. A slender straggling herb, branches 6 to 12 in long, decumbent and often rooting at the nodes; all parts glabrous. *Leaves* orbicular-ovate, serrate; lamina 4 to 5 in. long, 35 to 45 in. wide, apex acute or sub-acute, base cuneate; petiole slender, 25 in long. *Flowers* axillary on 2-4-flowered peduncles; pedicels 25 in. long, slender; bracteoles minute. *Calyx* tubular with very wide wings, in fruit sub-orbicular 3 in. in diam. *Corolla* 35 in. long, white or white and pink, distinctly exserted. DC Prod X. 409; Miq. Flor. Ind Bat II. 688, Hook. f. Flor. Brit. Ind IV. 276. *T. cardiosepala*, Benth. in DC Prod. X. 409. *Herpestes polygonoides*, Benth. in Wall. Cat. 3897.

SINGAPORE: Wallich 3897! King's Collector! Hullett! Murton, Kuntze! Schomburgk! Anderson! Kurz! MALACCA: Mangay! Griffith! Goodenough! PENANG: Bouton; Deschamps! PERAK: Gapis Pass, Curtis 2683!

2. *TORENIA PEDUNCULARIS*, Benth. in Wall. Cat. 3956. An erect annual herb 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with recurved hairs. Leaves ovate-lanceolate, base cordate, apex acuminate, margin serrate; lamina membranous 1 to 2 in. long, .5 to 1 in. wide, sparingly hairy on both surfaces; petiole slender, sparsely hirsute, .5 to .75 in. long. Flowers axillary solitary, or the uppermost in a sub-umbellate corymb or a terminal raceme, the lowest in the raceme leaf-opposed; pedicels .3 in., in fruit .5 in. long, thickened upwards, shorter than the calyx; bracteoles linear-subulate small. Calyx-tube narrow-ovate, .6 in., in fruit .85 in. long, wings broad, decurrent on the pedicel, the margins ciliate. Corolla .75 in. long, little exserted, tube yellow below, pale blue above, lateral lobes of lip with darker blotches. Stamens with glabrous filaments not appendaged. Disk cupular. Hook. f. Flor. Brit. Ind. IV. 276. *T. edentula*, Benth. in DC. Prod. X. 410, Bot. Mag. t. 4229.

PENANG: Schomburgk! MALACCA: Goodenough! PERAK: Scortechini! Ridley 9457! 9758! Ipoh, Curtis! NICOBAR: Kamorta, Kurz!—DISTRIB. Indo-China, Java, Timor.

3. *TORENIA CILIATA*, Sm in Rees Cyclop. V. 36. An erect annual herb, 1 to 2 feet high, branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles. Leaves ovate, base wide cuneate, apex obtuse or sub-acute, margin entire or crenate; lamina membranous 1.5 to 2.5 in. long, .75 to 1.25 in. wide, sparingly hairy on both surfaces; petiole winged above .25 to .5 in. long, sometimes shorter. Flowers in distant pairs, racemed at the ends of the branches; pedicels .3 in., in fruit .4 in. long, thickened upwards, as long as or longer than the calyx, bracteoles .3 in. long, linear, hirsute, as long as the flowering pedicels. Calyx very narrow-tubular, .4 in., in fruit .6 in. long, wings distinct but narrow, the margins ciliate. Corolla .75 in. long, distinctly exserted, light blue. Benth. in DC. Prod. X. 411; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 279. *T. racemosa*, Benth. Scroph. Ind. 38 (not of Griff.). *T. cœrulea*, Miq. Flor. Ind. Bat. Suppl. 562. *T. flava*, Wall. Cat. 3957 (in part); Miq. Flor. Ind. Bat. Suppl. 562 (not of Ham).

PENANG: Wallich! Deschamps! PERAK: King's Collector! Scortechini! Ridley!—DISTRIB. Sumatra, Timor.

Very near to *T. peduncularis*, and really only separable by its smaller more winged calyx. It may be remarked that Kurz in Herb. Calcutta has suggested that *T. ciliata*



is = *T. peduncularis*, while in the field Scortechini has named *T. peduncularis*, "*T. ciliata*."

4. *TORENIA ASIATICA*, Linn. Sp. Pl. 619. A sub-erect or spreading slightly branching herb, stems quadrangular glabrous. *Leaves* ovate-lanceolate, base cuneate, margin finely serrate; lamina 1.5 to 2.5 in. long, 1 to 1.5 in. wide, membranous, glabrous; petiole slender, glabrous, .5 in. long. *Flowers* axillary, pedicels .5 in. long; bracteoles minute subulate. *Calyx* .5 in. long, deeply 5-partite, lobes narrow-lanceolate, with a prominent midrib. *Corolla* 1.5 in. long, tube narrow-cylindric at base, infundibuliform above, dark violet on both sides, upper lobe erect, lip 3-lobed spreading, all yellowish. *Stamens* with appendages on anterior filaments. *Disk* cupular waved Wight Ic. t. 862, Benth. in DC. Prod. X. 410; Wall. Cat. 3953 A. B.; Miq. Flor. Ind. Bat. II. 689; Gaertn. Fruct. III. 29, t. 184, Lamk Ill. t. 523; Bot. Mag. t. 4249; Lem. Ill. Hortie. t. 199, Flore des Serres II. t. 157, XIII. t. 1342; Hook. f. Flor. Brit. Ind. IV. 277. *Treisteria cordata*, Griff. Notul. IV. 109. Rheede Hort. Malab. IX. t. 53.

PERAK: *Scortechini* 2212! *Ridley* 5307! 9756! *King's Collector* 1816! *Curtis*! SELANGOR. *Ridley* 8533!—DISTRIB. India, Sumatra, Java, Indo-China, China.

5. *TORENIA BENTHAMIANA*, Hance Ann. Sc. Nat. Ser. 4. XVIII. 226. A slender straggling herb, branches 6 to 10 in. long, decumbent and often rooting at the nodes, all parts sparingly hirsute. *Leaves* ovate, acute, margin serrate; lamina .5 to .75 in. long, 3 to .4 in. wide, base truncate or cuneate; petiole .25 in. long. *Flowers* axillary, solitary, pedicels .75 to 1.25 in. long, slender, bracteoles minute. *Calyx* very narrow-tubular, .35 in. long, in fruit 5 in. long, keeled and channelled but not winged, hirsute with sparse spreading hairs. *Corolla* 1.25 in. long, distinctly exserted; tube violet purple, limb yellow. *T. Baillonii* Godef. in Ill. Hortie. XXV. t. 324, E. Morr. in Belg. Hortie. XXIX. t. 9, f. 2. *T. flava*, Bot. Mag. t. 6700 (not of Ham.).

JOHORE: *Ridley* 4160!—DISTRIB. Siam, Cochin-China, S. China.

6. *TORENIA FLAVA*, Ham. in Wall. Cat. 3957. An erect annual herb, 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with spreading hairs. *Leaves* ovate or ovate-oblong, base wide-cuneate, margin entire or crenate, lamina membranous 1 to 1.5 in. long, .7 to 1 in. wide, hairy on both surfaces; petiole winged above, often very short. *Flowers* racemed at the ends of the branches; pedicels 2 in., in fruit .3 in. long, thickened upwards, shorter than the calyx; bracteoles .4 in. long linear, hirsute, rather longer than the fruiting pedicels. *Calyx* very narrow-tubular .35 in., in fruit .5 in. long, keeled and channelled but not winged, hirsute

throughout with sparse spreading hairs. *Corolla* .75 in. long, distinctly exserted, bright yellow. Benth. Scroph. Ind. 38, and in DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 278. *Pentstemon racemosus*, Griff. Notul. IV. 120. *Mimulus hirsutus*, Bl. Bijdr. 756.

PERAK: *Kunstler* 904!—DISTRIB. Indo-China, Malaya.

# 7. VANDELLIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, often toothed, usually penninerved. *Flowers* small, axillary or racemose, bracteoles 0. *Calyx* campanulate, 5-toothed, or oftener deeply 5-partite, neither keeled nor winged. *Corolla* 2-lipped; upper lip outmost, erect, concave, emarginate or 2-fid; lower wider, spreading, 3-lobed; tube cylindric. *Stamens* 4, didynamous; the posterior pair inserted in corolla-tube, usually included, the anterior pair inserted on corolla-throat, with arched filaments appendaged near the base, anthers contiguous or connate in pairs under upper lip, cells divaricate. *Ovary* 2-celled; ovules in each cell numerous, style slender; stigma 2-lamellate. *Fruit* a globose or ovoid, or long cylindric, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species about 30, mostly S.E. Asiatic.

Capsule about equalling or shorter than the calyx —

Calyx very shortly 5-lobed .. . 1. *V. crustacea*.

Calyx divided almost to the base in 5 sepals —

Sepals longer than the capsule —

Stems erect; all parts sparsely beset with spreading hairs;  
leaves entire or sinuate .. . 2. *V. hirsuta*.

Stems procumbent, all parts softly villous; leaves crenate-  
serrate .. . 3. *V. mollis*.

Sepals not longer than the capsule —

Leaves scissile .. . 4. *V. scabra*.

Leaves petioled .. . 5. *V. elata*

Capsule much longer than the calyx .. . 6. *V. pedunculata*.

1. *VANDELLIA CRUSTACEA*, Benth. Scroph. Ind. 35. A diffusely trichotomously branched, glabrous or sparsely hairy herb; branches mostly from near the root; stems 4 to 18 in. high. *Leaves* ovate or lanceolate, entire or serrate; lamina .5 to 1 in. long, .25 to .5 in. wide; petioles short. *Flowers* axillary or sub-racemose; pedicels slender, strict, .5 to 1.5 in. long. *Calyx* shortly 5-lobed, in flower 1 in., in fruit .15 in. long. *Corolla* pale purple or white. *Capsule* ovate-oblong, obtuse, .12 in. long. DC. Prod. X. 413; Wight Ic. t. 863; Miq. Flor. Ind. Bat. II. 690; Hook. f. Flor. Brit. Ind. IV. 279. *V. alba*, Benth.

Scroph. Ind. 35. *Torenia varians*, Roxb. Fl. Ind. III. 96. *T. lucida*, Ham. in Wall. Cat. 3962. *T. alba*, Ham. in Wall. Cat. 3961 partly. *T. flaccida*, R. Br. Prod. 440. *Gratiola lucida*, Vahl Enum. I. 95; Roxb. Cor. Pl. II. 2, t. 202, and Flor. Ind. I. 138. *G. aspera*, Roth Nov. Pl. II. *Peristea paniculata*, Griff. Notul. IV. 119. *Capraria crustacea*, Linn. Mant. 87. *Morgania lucida*, Spreng. Syst. II. 802. *M. aspera*, Spreng. Syst. II. 803. *Mimulus javanicus*, Bl. Bijdr. 283. *Hornemannia ovata*, Link & Otto Ic. Pl. Sel. I. 9, t. 3. *Tittmannia ovata*, Reichb. Icon. Exot. I. 27. *Antirrhinum hexandrum*, Forsk. Flor. Ægypt.-Arab. 43. Rumph. Herb. Amb. V. t. 170, f. 3.

PENANG: *Curtis*! PROV. WELLESLEY: *King*! PERAK: *Curtis*! SINGAPORE: *Wallich*! *Schomburgk*! *Ridley*! *Hullett*! *Kunstler*! *Deschamps*! *Kurz*! PAHANG: *Ridley*! MALACCA: *Hervey*!—DISTRIB. Cosmopolitan in the tropics.

2. *VANDELLIA HIRSUTA*, Benth. Scroph. Ind. 36. An erect succulent trichotomously branched herb, 4 to 6 in. high, sparsely clothed with spreading hairs. *Leaves* ovate or oblong, obtuse, entire or sinuate, 1 to 3 in. long; upper sessile .5 to 1 in. wide, lower petioled, .4 to .75 in. wide. *Flowers* minute in many-flowered racemes; pedicels slender, .15 to .2 in. long. *Sepals* lanceolate .08 in., in fruit .1 in. long. *Corolla* blueish-white. *Capsule* orbicular .08 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia ovata*, Benth. in Wall. Cat. 3942. *T. viscosa*, Reichb. Ic. Exot. I. 26, t. 38. *Hornemannia prostrata*, Jacq. Ecl. t. 150

PERAK: *Kunstler*! PAHANG: *Ridley*! SINGAPORE: *Ridley* 2701!—DISTRIB. S.E. Asia generally.

3. *VANDELLIA MOLLIS*, Benth. Scroph. Ind. 37. A procumbent herb; stems creeping below, 6 to 18 in. long, slender or stoutish, softly villous with spreading white hairs. *Leaves* ovate or ovate-oblong, obtuse or sub-acute, margin crenate-serrate; both surfaces softly villous with white glistening hairs; nerves 3 to 4 pairs, oblique, ascending; length 1 to 1.5 in., width .5 to .75 in.; petiole short, 2 in. long or less. *Flowers* on axillary pedicels or in axillary or terminal racemes, the pedicels slender, softly villous, .25 to .75 in. long. *Sepals* subulate-lanceolate, softly villous with white hairs, .4 to .5 in. long. *Corolla* .5 to .6 in. long, tube white, upper lip brown and lower lip yellow. *Stamens* with filaments hirsute below, the upper pair with orbicular basal processes. *Capsule* oblong, .2 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 281. *Tittmannia hirta*, Benth. in Wall. Cat. 3948.

SELANGOR: *Rawang*, *Ridley* 7605!—DISTRIB. Eastern Himalaya, S. China, Indo-China, Sumatra, Java.

4. *VANDELLIA SCABRA*, Benth. Scroph. Ind. 36. A slender diffusely branched herb with rather rigid stems and branches, the latter 2 to 4 in. long; more or less clothed everywhere with long white spreading hairs. *Leaves* broadly ovate or ovate-cordate, or orbicular, serrate or entire, acute or obtuse; lamina .3 to .6 in. long, .3 in. wide. *Flowers* axillary or terminal, on slender capillary pedicels .5 to 1.5 in. long, strict, spreading in fruit, much longer than calyx. *Sepals* lanceolate, hirsute or glabrous, .1 in. long. *Corolla* .3 in. long. *Capsule* orbicular .1 in. long. DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 692; Griff. Notul. IV. 122, and Io. Pl. Asiat. t. 418, f. 4; Hook. f. Flor. Brit. Ind. IV. 281. *V. monmerioides*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Torenia hirta*, Cham. & Schlecht. Linnæa II. 571. *T. globosa*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Gratiola pusilla*, Willd. Sp. Pl. I. 105. *Columnnea minuta*, Roxb. Flor. Ind. III. 98. *Tittmannia pusilla*, Benth. in Wall. Cat. 3945 partly. *T. sulcata*, Wight in Wall. Cat. 3946 partly. *Bonnaya Vahl*, G. Don Gen. Syst. IV. 538. *Stemodia minuta*, G. Don Gen. Syst. IV. 542. *Selago pusilla*, Thunb. Prod. Fl. Cap. 99.

MALACCA: Griffith! PROV. WELLESLEY: King! NEGRI SEMBILAN. Serembam, Ridley 10090! SINGAPORE: King's Collector! Ridley!—DISTRIB. S.E. Asia generally, Africa, Madagascar.

5. *VANDELLIA ELATA*, Benth. Scroph. Ind. 36. A slender, sub-erect or diffuse, glabrous or sparingly hirsute herb, stems simple or dichotomously branched, sometimes rooting near the base; branches slender, 6 to 8 in. long or longer. *Leaves* ovate, coarsely crenate-toothed, acute, base cuneate entire passing into the petiole; lamina .3 to .5 in. long, .25 to .3 in. wide; petiole .15 to .25 in. *Flowers* axillary or terminal, on slender capillary pedicels .3 to .5 in. long, strict, somewhat spreading in fruit, much longer than calyx. *Sepals* narrow-lanceolate, sparingly hirsute, .09 in. long. *Corolla* very small, pale blue, .1 in. long. *Capsule* broadly oblong, .12 in. long, as long as the fruiting sepals. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia elata*, Benth. in Wall. Cat. 3944.

SINGAPORE: Ridley!—DISTRIB. Tenasserim, Borneo.

6. *VANDELLIA PEDUNOULATA*, Benth. Scroph. Ind. 37. A slender glabrous herb, stem sometimes creeping at the base; branches slender, 4 to 10 in. long, prostrate. *Leaves* ovate, obtuse or sub-acute, obscurely crenate-toothed, .5 to 1 in. long, .4 in. wide, shortly petioled. *Flowers* axillary and in terminal racemes; pedicels slender 1.5 in. long, usually twice as long as leaves or longer. *Sepals* 5, narrowly lanceolate, free almost to the base, .25 in. long. *Corolla* white, or pale blue with a white spot. *Capsule* linear-lanceolate, .5 in. long. DC. Prod. X. 416;

Griff. Notul. IV. 120; Ic. Pl. Asiat. t. 418, f. 2; Hook. f. Flor. Brit. Ind. IV. 282. *V. Roxburghii*, G. Don Gen. Syst. IV. 549. *V. cordifolia*, G. Don. Gen. Syst. IV. 549. *Gratiola cordifolia*, Vahl Enum. I. 97; Don Prod. 85. *Bonnaya cordifolia*, Spreng. Syst. I. 42. *Tittmannia grandiflora*, Benth. in Wall. Cat. 3949. *Torenia diffusa*, Roxb. Fl. Ind. II. 95. *T. varians*, Griff. Notul. IV. 125 (not of Roxb.).

MALACCA: *Hervey*! SINGAPORE: *King's Collector*! *Thomson*! *Ridley*! JOHORE: *Ridley*! PERAK: *Wray*! *Scortechini*! *Ridley*! PENANG: *Curtis*!—DISTRIB. S.E. Asia generally.

#### 8. ARTANEMA, Don.

Herbs with rather tall, erect, angled stems. *Leaves* opposite, entire or serrate, scabrid above as are the stem-angles. *Flowers* large, blue, pink or white, in terminal racemes; bracts leafy; bracteoles obsolete. *Calyx* 5-partite; lobes acuminate, smooth, much dilated. *Corolla* 2-lipped; upper lip outmost, erect, broad, emarginate; lower 3-lobed, spreading, throat not plicate, tube wide-cylindric. *Stamens* 4, didynamous, posterior pair short included, anterior pair long with arching filaments dilated at the base; anther-cells confluent at their tips. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose septicidal capsule; valves 2, separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species 3 to 4, in tropics of Eastern Hemisphere and Australia.

Leaves shortly petioled; flowers over .5 in. long .. .. 1. *A. sesamoides*.  
Leaves sessile, narrower; flowers under .5 in. long.. .. 2. *A. angustifolium*.

1. ARTANEMA SESAMOIDES, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* shortly petioled, lanceolate-acuminate, entire or serrate, 2 to 4 in. long, .75 to 1.25 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .3 to .5 in. long, usually slightly exceeding the calyx. *Calyx* of 5 sub-equal lobes, .25 to .3 in. long. *Corolla* blue, .75 in. long. *Capsule* globose, .3 in. in diam. DC. Prod. X. 408; Wight Ic. t. 1410, Miq. Flor. Ind. Bat. II. 686; Hook. f. Flor. Brit. Ind. IV. 274. *Columnea longifolia*, Linn. Mant. 90. *Achmanes sesamoides*, Vahl Symb. II. 71. *Diceros longifolius*, Pers. Synops. II. 164; Bl. Bijdr. 751; Wall. Cat. 3884.

PENANG: Pulo Boutong, *Curtis*!—DISTRIB. S.E. Asia generally.

2. ARTANEMA ANGUSTIFOLIUM, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* sessile, lanceolate to linear-lanceolate, 3 to 4 in. long, .25 to .75 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .15 in. long, always shorter than the calyx. *Calyx* of 5 sub-equal sepals, .2 in. long. *Corolla* pale blue and white, or pink or white, .3 to .4 in.

long. *Capsule* globose, .2 in. in diam. DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Diceros angustifolius*, Wall. Cat. 3885.

PENANG: *J. Scott*! *Ridley* 9412! PERAK: *Scortechini*! *Wray* 2246! 2721! *King's Collector* 3045! PAHANG: *Ridley* 2165A! SINGAPORE: *Wallich* 3885! SELANGOR: *Sepang*, *Ridley* 7604! JOHORE: *Serom*, *Ridley* 11134!

Very nearly related to *A. sesamoides*, which differs chiefly by its larger blue flowers and larger capsules.

#### 9. CURANGA, Juss.

Herbs, creeping or diffuse. *Leaves* opposite, ovate, crenate. *Flowers* in short terminal or pseudo-axillary racemes; bracts small, leafy; bracteoles 0. *Calyx* deeply 4-partite; upper and lower lobes very large, lateral small and narrow. *Corolla* 2-lipped; upper lip outmost, wide-arched, emarginate, lower longer, spreading, 3-lobed; tube short. *Stamens* 2, only the upper pair perfect, included, inserted on corolla-tube; anthers connate with divaricate cells; lower pair of stamens replaced by 2 clavate staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* an orbicular septicidal capsule, covered by the accrescent calyx-lobes, valves separating from the broad placentiferous septum. *Seeds* many, rugose.—DISTRIB. Species 2, S.E. Asiatic.

CURANGA AMARA, Juss. Ann. Mus. IX. 320. An annual glabrous herb, with slender straggling divaricate branches, 2 to 3 feet long, rooting at the lower nodes. *Leaves* very bitter, ovate, crenate, obtuse or acute, base truncate rounded or cuneate, entire; blade 2 to 2.5 in. long, 1.5 to 2 in. wide; petiole very slender, .5 to .75 in. long. *Flowers* in short, few-flowered racemes, 2 to 2.5 in. long; pedicels .25 to .3 in., in fruit .5 in. long. *Calyx* with the outer sepals broadly ovate-cordate, membranous, reticulate, in flower .25 in., in fruit .5 in. long. *Corolla* brownish-red. *Capsule* small, compressed, .15 in. across. Benth. in DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Caranga amara*, Vahl Symb. I. 100. *Gratiola amara*, Roxb. Flor. Ind. I. 136. *Herpestis amara*, Benth. Scroph. Ind. 30. *Symphillium torenioides*, Griff. in Madr. Journ. Nat. Sc. IV. 1, t. 11. *Treisteria assamica*, Griff. Notul. IV. 111. Rumph. Herb. Amboin. V. t. 170, f. 1.

PERAK. *Scortechini* 499B! *Ridley* 9742! PAHANG: *Ridley* 1346! SELANGOR: *Ridley* 8214!—DISTRIB. East Himalaya, Indo-China, Malaya, Philippines.

#### 10. BONNAYA, Link & Otto.

Herbs, annual, glabrous. *Leaves* opposite, serrate or entire. *Flowers* solitary axillary, often passing into terminal racemes; bracteoles 0.

*Calyx* 5-partite; segments narrow, faintly imbricate. *Corolla* 2-lipped; upper lip outmost, erect, concave, 2-fid; lower larger, spreading, 3-lobed; tube cylindric. *Stamens* 2; upper pair alone perfect, sub-included; anthers contiguous, the cells divaricate; lower pair represented by 2 obtuse, glandular, entire staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a narrow, exserted, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose. —**DISTRIB.** Species about 10, in tropics of Eastern Hemisphere.

Leaves sharply, closely, deeply serrate. —

Leaves sessile; flowers white or pink; stems green .. 1. *B. brachiata*.

Leaves petioled; flowers purple, stems reddish .. 2. *B. reptans*

Leaves remotely, shallowly serrate, or sub-entire; flowers violet-purple. —

Leaves narrow-oblong . . . . . 3. *B. veronicaefolia*.

Leaves lanceolate .. .. . { 3b. *veronicaefolia*,  
var. *verbenaeifolia*.

1. **BONNAYA BRACHIATA**, Link & Otto, Ic. Pl. Sel. I. 25, t. 11. An erect rather rigid herb, 4 to 10 in. high; branches diffuse divaricate, the lowest decumbent below. *Leaves* oblong, obtuse or acute, margins thickened and sharply closely deeply serrate with teeth mucronate, lamina .5 to 1.5 in. long; pedicels rigid about .25 in long; bracts small. *Calyx* of 5 nearly free sepals .25 in. long. *Corolla* white or pink, .25 in. long. *Capsule* slender, spreading or erect, .5 to .6 in. long. Benth. in Wall. Cat. 3855, Scroph. Ind. 32, and DC. Prod. X. 420, Miq Flor. Ind. Bat. II. 695; Hook. f Flor Brit. Ind. IV. 284. *B. serrata*, Griff. Notul. IV. 108. *B. pusilla*, Benth. Scroph. Ind. 33; Wall. Cat. 3861. *Gratiola serrata*, Roxb. Flor Ind. I. 139, and ed. Carey & Wall. I. 140 Rheede, Hort. Malab. IX. t. 59.

**SINGAPORE:** Wallich! **PAHANG.** Ridley! —**DISTRIB.** India, Indo-China, China, Malaya, Philippines

Wallich's Singapore specimen and one of Ridley's from Pahang belong to the form distinguished by Benthham as *B. pusilla*, another Pahang gathering (Ridley 2163) consists of genuine *B. brachiata*, from which, however, *B. pusilla*, though separable as a marked form, is hardly separable as a variety.

2. **BONNAYA REPTANS**, Spreng. Syst. I. 41. A prostrate creeping slender herb with reddish stem, branches and leaves beneath; branches diffuse-spreading often 12 in. long. *Leaves* in distant pairs, obovate-oblong, obtuse, margins thickened and sharply serrate with mucronate teeth; base narrow-cuneate passing into a petiole .25 in. long; blade .75 to 1.25 in. long, .5 in. wide. *Flowers* opposite in terminal racemes sometimes 3 to 4 in. long; pedicels rigid, .25 in. long; bracts small.

*Calyx* of 5 nearly equal sepals, .3 in. long. *Corolla* purple, .75 in. long. *Capsule* very slender, spreading, 1 in. long. Benth. in DC. Prod. X. 420; Wall. Cat. 3856; Hook. f. Flor. Brit. Ind. IV. 284. *B. ruellloides*, Spreng. Syst. I. 41. *B. ciliata*, Spreng. Syst. I. 41. *Gratiola ciliata*, Koenig in Vahl Symb. I. 97. *G. ruellloides*, Koenig in Vahl Symb. I. 99. *G. reptans*, Roxb. Flor. Ind. I. 140. *Henckelia Roxburghiana*, Dietr. Sp. Pl. I. 572.

PENANG: *Curtis*! PERAK: *Scortechini*! WRAY! PROVINCE WELLESLEY: *Ridley* 6985! PAHANG: *Ridley*! SINGAPORE: *Hullett*! *Ridley*!—DISTRIB. E. Himalaya, India, Indo-China, Malaya, Philippines.

3. BONNAYA VERONICÆFOLIA, Spreng. Syst. I. 41. A flaccid decumbent or creeping herb, with ascending branches 4 to 8 in. long. *Leaves* sub-sessile or narrowed into a short petiole, oblong or oblong-lanceolate or obovate, or lanceolate, obtuse or acute, margin distantly serrate or sub-serrate or sub-entire. *Flowers* opposite, in terminal leafy or naked racemes sometimes up to 6 in. long usually much shorter, pedicels rather flaccid, .25 in. to .35 in. long; bracts leafy or small. *Calyx* of 5 nearly equal sepals .2 in. long. *Corolla* violet-purple, .25 to .35 in. long. *Capsule* slender, sub-erect or spreading, .5 to .6 in. long.

VAR. *typica*. *Leaves* usually obtuse, sometimes acute, always distantly serrate, 1 to 2 in. long, .5 in. wide, racemes usually with leafy bracts; *corolla* .25 in. long. *B. veronicæfolia*, Wall. Cat. 3857, Benth. in DC. Prod. X. 421, Wight Ic. t. 1411; Miq. Flor. Ind. Bat. II. 696, Hook. f. Flor. Brit. Ind. IV. 285. *B. marginata*, Spreng. Syst. I. 41. *B. rigida*, Benth. in Wall. Cat. 3859. *B. procumbens*, Benth. in Wall. Cat. 3860. *B. Rothii*, Dietr. Sp. Pl. I. 556. *B. bracteata*, Griff. Notul. IV. 107. *Gratiola veronicæfolia*, Retz. Obs. IV. 8. Roxb. Pl. Corom. II. 30, t. 154, Fl. Ind. I. 138, ed. Carey & Wall. I. 139. *G. marginata*, Colson in Vahl Enum. I. 98. *G. racemosa*, Roth Nov. Sp. 9.

PENANG: Balli Pulo, George Town, &c. *Deschamps*! SINGAPORE: *King's Collector*! PAHANG: *Ridley*! MALACCA: *Hervey*! SELANGOR: *Ridley*! JOHORE: Serom, *Ridley*!—DISTRIB. Throughout S.E. Asia.

VAR. *verbenæfolia*, Hook. f. Flor. Brit. Ind. IV. 285. *Leaves* acute or sub-acute, distantly shallowly serrate or sub-entire, 1 to 1.5 in. long, .2 to .25 in. wide; racemes usually marked with minute bracts, *corolla* .35 in. long. *B. verbenæfolia*, Benth. in DC. Prod. X. 421; Wall. Cat. 3858, Wight, Ic. t. 1412. *B. Roxburghiana*, Dietr. Sp. Pl. I. 559. *B. cyanea*, Griff. Notul. IV. 107. *Gratiola verbenæfolia*, Colson in Vahl Enum. I. 96. *G. ciliata*, Colson in Vahl Enum. I. 97. *G. racemosa*, Roxb. Fl. Ind. I. 138, and ed. Carey & Wall. I. 139. *G.*



*Roxburghiana*, Roem. & Schult. Syst. I. 123. *Tittmannia Colsonii*, Benth. in Wall. Cat. 3950. *Torenia gracilis*, Benth. in Wall. Cat. 3952.

MALACCA: *Hervey*! PENANG: *Curtis*! PERAK: *Ridley*! *Scortechini*!—DISTRIB. Throughout S.E. Asia.

# 11. SCOPARIA, Linn.

Undershrubs or herbs with twiggy branches. *Leaves* opposite or whorled, glabrous or pubescent, entire or toothed, punctate. *Flowers* small, white or yellow, axillary, solitary or 2-nate; bracteoles 0. *Calyx* small, 4-5-partite; lobes imbricate. *Corolla* small, rotate, 4-lobed; lobes imbricate, sub-equal, obtuse; throat densely bearded; tube very short. *Stamens* 4, sub-equal; filaments filiform; anthers sub-sagittate, cells diverging or parallel, discrete. *Ovary* 2-celled, ovules in each cell numerous; style sub-clavate; stigma truncate or emarginate. *Fruit* a small, ovoid or globose, septicidal capsule; valves membranous, with inflexed margins, separating from the placentiferous septum. *Seeds* many, small, obovoid, angular, scrobiculate.—DISTRIB. Species about 6, all American.

SCOPARIA DULCIS, Linn. Sp. Pl. 116 A glabrous much-branched erect or ascending leafy undershrub with a strong perennial woody rootstock; stems 6 in. to 3 ft. high. *Leaves* opposite or ternate, lanceolate or elliptic-lanceolate, 1 to 2 in. long, .5 to 1.5 in. wide, serrate, acute or obtuse, narrowed to a short petiole. *Flowers* many minute in terminal panicles; pedicels slender, strict, .25 to .4 in. long. *Sepals* 4, oblong. *Corolla* white, .12 in. in diam., tube very short. *Stamens* sub-equal. *Capsule* globose, .15 in. in diam. Voigt Hort. Suburb. Calcutt. 507; Benth. in DC. Prod. X. 431; Gaertn. Fruct. I. 251, t. 53, f. 10, Miq. Flor. Ind. Bat. II. 699; Hook. f. Flor. Brit. Ind. IV. 289.

PENANG: *Kampai*, Batu Gaja, &c., *King*! *Deschamps*! *Curtis*! SELANGOR: *Ridley*! PERAK *Scortechini*! SINGAPORE. *Hullett*! *Kurz*! *King's Collector*! *Deschamps*!—DISTRIB. Everywhere in the tropics; originally American.

# 12. STRIGA, Lour.

Herb, semiparasitic on roots, usually scabrid, discoloured when dry. *Leaves* opposite below, alternate above, linear, entire or rarely toothed sometimes reduced to scales. *Flowers* axillary, or the upper in bracteate spikes; bracteoles usually 2. *Calyx* 5-toothed or 5-fid, 5- or 10- or 15-ribbed, tubular. *Corolla* 2-lipped; upper lip inner in bud,

usually shortly 2-fid or emarginate, lower 3-lobed; limb spreading; tube slender abruptly incurved at or above the middle. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse; connective sometimes mucronate. *Ovary* 2-celled; ovules in each cell numerous; style thickened upwards; stigma entire. *Fruit* an oblong or globose loculicidal capsule, valves entire, firm, septiferous, separating from the placentas. *Seeds* many, small, ovoid or oblong, reticulated.—**DISTRIB.** Species 20, in the tropics of the Eastern Hemisphere.

**STRIGA LUTEA**, Lour. Flor. Cochinchin. 22. A slender, erect, simple or fastigiately branched herb, 6 to 18 in. high; leaves and stems scabrid or villous. *Leaves* linear, .5 to 1.5 in. long, .12 in. wide. *Flowers* in elongated, usually interrupted spikes, 2 to 6 in. long; bracts usually exceeding the calyx, linear-lanceolate, scabrid. *Calyx* 10-ribbed, .25 in. long, teeth 5, sub-equal. *Corolla* white or yellow or pink or purple, .5 in. long, glabrous, incurved; upper lip emarginate reflexed; lower lip 3-lobed spreading. *Capsule* oblong, grooved, shorter than the calyx. Benth. in Hook. Comp. Bot. Mag. 1. 363; Hook. f. Flor. Brit. Ind. IV. 299. *S. hirsuta*, Benth. in DC. Prod. X 502; Dalz. & Gibs. Bomb. Flor. 181. *S. coccinea*, Benth. in DC. Prod. X 364. *S. phænicea*, Benth. in DC. Prod. X. 364. *Buchnera asiatica*, Linn. Sp. Pl. 630 partly; Roxb. Fl. Ind. III. 31, Benth. Scroph. Ind. 40. *B. coccinea*, Benth. Scroph. Ind. 40, Wall. Cat. 3870. *B. phænicea*, Benth. Scroph. Ind. 40; Wall. Cat. 3874. *Campuleia coccinea*, Hook. Flor. Exot. t. 203. Rheede Hort. Malab. IX. t. 66

PENANG: *Curtis* 1840! PAHANG: *Ridley*! SINGAPORE: *Ridley* 139, *Kurz*! ANDAMANS: Port Blair, *King*! *Prain*!—**DISTRIB.** Throughout S.E. Asia, Arabia, Madagascar, Africa.

### 13 CENTRANTHERA, R. Br

Herbs, semiparasitic, annual, rigid, scabrous. *Leaves* opposite throughout, or opposite below alternate above, oblong or linear, obtuse, entire or toothed. *Flowers* axillary, or in bracteate spikes or racemes, bracteoles 2. *Calyx* compressed, spathaceous, split on one side, acuminate entire, or shortly 3-5-lobed on the other. *Corolla* 5-lobed; lobes sub-equal, spreading, the 2 upper inmost in bud; limb oblique; tube long, incurved. *Stamens* 4, didynamous, included; anthers contiguous in pairs; cells transverse, spurred or mucronate at base, one cell often sterile. *Ovary* 2-celled, ovules in each cell numerous, style simple, dilated above, stigma acute, linguiform. *Fruit* an ovoid or sub-globose loculicidal capsule; valves entire, carrying away the

**placentas.** *Seeds* many, small, oblong-cuneate; *testa* lax, reticulate.—  
**DISTRIB.** Species 4–5, E. Asiatic and Australian.

**CENTRANTHERA HUMIFUSA**, Wall. Cat. 3883. A dwarf herb, diffusely branching from the base, hispid or glabrous, branches 3 to 6 in. long. *Leaves* linear, entire, .5 to .75 in. long. *Flowers* in terminal spikes, sub-sessile; bracts small. *Calyx* ovoid, sub-acute, .15 in. long. *Corolla* yellow, .3 to .5 in. long, incurved. *Capsule* sub-globose, .15 in. wide. Benth. in DC. Prod. X. 525; Hook. f. Flor. Brit. Ind. IV. 301. *Razumovia tranquebarica*, Spreng. Syst. II. 812. *Torenia lepidota*, Roth Nov. Sp. 281.

**MALACCA:** Griffith! **SINGAPORE:** Kurz!—**DISTRIB.** China, Indo-China, India, Malaya.

#### Order LXXXIV. OROBANCHACEÆ.

[By D. PRAIN.]

Root-parasites, annual, white or reddish. *Stem* simple or branched, stout or slender, clothed with leaf scales. *Leaves* proper 0. *Flowers* solitary or in spikes or racemes, irregular. *Sepals* 4–5, usually connate in a variously toothed or spathaceous calyx, rarely free. *Corolla* hypogynous, 2-lipped, upper lip vaulted, lower lip 3-lobed; throat often with 2 villous folds; tube curved. *Stamens* 4, didynamous, inserted on corolla-tube; anthers 1–2-celled; cells spurred at the base, dehiscence by slits or basal pores; one cell sometimes imperfect. *Disk* unilateral or glandular or obsolete. *Ovary* of 2 connate carpels, usually 1-celled; style long, tip curved, stigma 2-lobed, sub-capitate, ovules usually numerous on generally 2 pairs of free or confluent parietal placentas which sometimes meet in the axis of the ovary. *Capsule* 1-celled, 2-valved; *seeds* usually many, minute, with a pitted or tubercled, rarely reticulate and lax testa; albumen fleshy; embryo ovoid, entire or 2-fid.

#### ÆGINETIA, Linn.

Leafless parasitic herbs with simple or branched naked or scaly stems or scapes. *Flowers* few, large, solitary or corymbose; bracteoles 0. *Calyx* spathaceous, split in front almost to the base. *Corolla* incurved, campanulate-tubular; limb obscurely 2-lipped, lobes somewhat spreading, the two upper lobes (upper-lip) connate. *Stamens* included; anthers with one perfect cell adnate to filament and not spurred; the other cell absent in upper anthers, empty clavate and deflexed in the lower. *Ovary* 1-celled; placentas large, 2-lobed or multifid, filling the chamber, ovuliferous throughout; style slender;

stigma large peltate. *Capsule* partially 2-valved. *Seeds* many, small, crowded; testa pitted.—DISTRIB. Species 3, S.E. Asiatic.

*ÆGINETIA PEDUNCULATA*, Wall. Pl. As. Rar. III. 13, t. 219. A leafless herb, 3 to 6 in. high; stems red or yellow, parasitic on roots, buried, emitting several short stout fleshy several-flowered scapes with alternate peduncled flowers; peduncles 1 to 4 in. long, stout, bracteate at base; bracts .25 to .35 in., ovate, obtuse. *Calyx* 1.5 to 2 in. long, fleshy, dull-pink at length yellowish-white, with a mucilaginous pad surrounding base of corolla, tip acute or obtuse. *Corolla-tube* yellow or white, the lobes violet or claret-coloured, crenate and erose. *Stamens* didynamous, anthers of lower pair with a large dorsal fleshy decurved horn. *Ovary* 1-celled, placentas 2, each of 2 plates; stigma cordate-peltate. *Capsule* ovoid. *Seeds* brown. Reut. in DC. Prod. XI. 43; Wight Ill. t. 158B, f. 6; Ic. t. 1421; Hook. f. Flor. Brit. Ind. IV. 320. *Æ. abbreviata*, Ham. in Wall. Cat. 3965; Benth. Scroph. Ind. 95; Reut. in DC. Prod. XI. 43. *Æ. acaulis*, Walp. Rep. III. 481; Reut. in DC. Prod. XI. 43. *Orobanche pedunculata*, Roxb. Hort. Beng. 45; Fl. Ind. iii. 29. *O. acaulis*, Roxb. Cor. Pl. III. 89, t. 292, and Fl. Ind. III. 29.

PERAK: Batang Padang Valley, 2,000 feet; Wray 1456! 1457!—DISTRIB. India, Indo-China, Java, Sumatra.

One of Wray's specimens is attached to the rhizome of a *Kempferia*.

#### CHRISTISONIA, Gardn.

Low fleshy scaly parasitic herbs, with yellow or white or rose-purple flowers; stems simple or tufted from a short or long rootstock; scales alternate, obtuse or acute. *Flowers* densely or laxly corymbose; bracteoles 2 or 0. *Calyx* tubular, terete or angular, 2-5-lobed or -toothed. *Corolla-tube* long, inflated or funnel-shaped, slightly or distinctly curved, 5-lobed, obscurely to distinctly 2-lipped, the two upper lobes (in our species outer in bud) sub-erect, the lower spreading. *Stamens* 4, included or sub-exserted; filaments stout; anthers with one perfect cell and one imperfect, one pair sometimes spurred or appendaged; rarely with both cells perfect. *Disk* 0. *Ovary* 1-celled with two 2-partite placentas, or 2-celled from the placentas meeting in the axis; style long, tip incurved, stigma large, 2-lobed, the upper lobe very small or obsolete, the lower (sometimes the only one present) very large orbicular or clavate; ovules numerous. *Capsule* ovoid or sub-globose, loculicidal. *Seeds* minute, crowded, many perfect with striate testa, others imperfect with lax testa; embryo half as long as the albumen.—DISTRIB. Species 12, tropical Asiatic.

**CHRISTISONIA SCORTECHINII**, Prain in Journ. As. Soc. Beng. LXXIII. 2. 205. *Stem* short hypogæal, covered with linear scales. *Flowers* 3 to 8, crowded in a dense corymb; some shortly peduncled, others sessile, each with an oblong cucullate basal bract .75 in. long; all parts loaded with sticky mucilage. *Calyx* spathaceous, rupturing into usually 2 (sometimes, *vide* Scortechini, into 2 to 4) lobes, in the fully opened flower with tube 1 in., lobes .25 in. long. *Corolla-tube* white, with a yellow line inside in front, 2 in. long, infundibuliform and curved above, the lower part narrow-cylindric 1 in. long; limb 2-labiate, upper lip outmost in bud, erect, 2-lobed, lower lip 3-lobed, spreading. *Stamens* didynamous; anthers all conniving; filaments glabrous, inserted below middle of corolla-tube, 1-celled, adnate to the enlarged filament, upper pair without, lower with an empty oblong pointed cell. *Disk* 0. *Ovary* glabrous, 1-celled, placentas 2, 2-fid, uniformly covered with ovules; style glabrous downwards; stigma peltate, flat, .2 in. in diam.

PERAK: *Scortechini*, 2121!

#### Order LXXXV. LENTIBULARIACEÆ.

[By D. PRAIN]

Marsh or aquatic herbs, or occasionally growing on wet rocks. *Leaves* radical, rosulate or when submerged capillary-multifid, sometimes obsolete. *Flowers* irregular, hermaphrodite, on 1-many-flowered simple or branched scapes, bracts small, sometimes 0, bracteoles under calyx 2 or 0. *Calyx* inferior, 2-5-lobed. *Corolla* 2-lipped and spurred; upper lip usually the smaller, entire or emarginate; lower lip 3-6-lobed. *Stamens* 2, adnate to the base of the corolla, alternate with the lobes of the lower lip, filaments widely curving, anther-cells ovate, transversely confluent; dehiscence longitudinal. *Carpels* 2, connate in a superior, globose, 1-celled ovary; ovules very many, on a free basal placenta; style short, stigma unequally 2-lobed. *Fruit* a globose 2-4-valved, or irregularly rupturing capsule. *Seeds* very many, minute; albumen 0.—**DISTRIB.** Species nearly 200, in all parts of the world.

#### UTRICULARIA, Linn.

Herbs, often very small, submerged or floating, or growing on wet rocks. *Leaves* in submerged or floating species multifid, with capillary segments, in erect or twining species entire, often disappearing at time of flowering, frequently with minute bladders. *Flowers* on simple or branched scapes, racemes few- or many-flowered; bracts and 2 bracteoles

distinct. *Calyx* 2-partite; lobes entire or nearly so, often accrescent. *Corolla* 2-lipped; upper lip entire or emarginate; lower larger 3-6-lobed; tube with a straight or curved spur. *Stamens* 2, adnate to base of corolla, alternate with lobes of lower lip; filaments broad; anthers ovate, 2-celled, or by confluence almost 1-celled. *Carpels* connate in a globose 1-celled ovary; ovules many, on a central placenta; style short; stigma unequally 2-lobed. *Capsule* globose, regularly 2-4-valved, or opening irregularly. *Seeds* many, small; albumen 0.—*DISTRIB.* Species 150, in most countries.

Leaves many, submerged, scattered, divided into numerous capillary segments—mostly interspersed with bladders; calyx-lobes equal or nearly so; pedicels not winged :—

Flowers yellow to pale-yellow or nearly white.—

Peduncles very slender; flowers usually two, never more than three, always under .25 in. across; pedicels in fruit erect. sometimes the capillary leaves absent .. .. 1. *U. exoleta*.

Peduncles stout; flowers usually more than three, and always from .35 to .5 in. across; pedicels reflexed in fruit and thickened under the calyx .. .. 2. *U. flexuosa*

Flowers blue or red or pink, pedicels erect in fruit .. .. 3. *U. punctata*.

Leaves few, 10-15 at base of stem —

Leaves linear or linear-spathulate, usually absent at time of flowering; calyx-lobes equal or nearly so, seeds not glochidiate —

Scales of the scape and bracts attached by their bases.—

Stems erect.—

Flowers yellow; pedicels in fruit distinctly winged .. 4. *U. bifida*.

Flowers pink, purple, or violet, rarely white with lilac markings —

Pedicels in fruit slightly winged; sometimes a few leaves still present at time of flowering; stems 8 to 12 in. high, stoutish .. .. 5. *U. affinis*  
VAR. *Griffithii*.

Pedicels in fruit capillary, short, wingless; leaves 0 at time of flowering; stems 2 to 3 in. high, very slender .. .. 6. *U. minutissima*

Stems twining; flowers yellow.—

Stems slender, leaves absent at time of flowering; lower lip less than 25 in. wide .. .. 7. *U. Wallichiana*.

Stems stouter; leaves forming matted masses; lower lip over .3 in. wide .. .. 8. *U. involvens*.

Scales of the scape and bracts produced downward below point of attachment.—

Flowers on distinct pedicels as long as the fruiting calyx or longer, capsule longer than fruiting calyx-lobes; flowers pink (*Ridley*) .. .. 9. *U. verticillata*.

Flowers almost or quite sessile; capsule hidden by the fruiting calyx-lobes:—

Flowers few, scattered on the very slender scapes; } 10. *U. racemosa*  
corolla white .. .. } VAR. *filicaulis*.

Flowers many or few, congested at the ends of the  
stouter rigid scapes and branches; corolla rarely pure  
white .. .. .

.. 11. *U. ophirensis*.

Leaves orbicular or spatulate-orbicular, persistent; calyx-lobes  
very unequal, the upper the larger; seeds glochidiate; stems  
very slender, lip pale-violet or white with a yellow centre .. 12. *U. orbiculata*.

1. *UTRICULARIA EXOLETA*, R. Br. Prod. 430. A water-weed, sometimes floating with very slender stems and submerged divided capillary leaves, the segments interspersed with bladders; sometimes growing in mud with capillary leaves absent and with tufted setaceous leaves. *Scapes* slender, naked, or with one or two scale-like bracts, 2 to 4 in. long, usually 2-flowered, occasionally 3-flowered, sometimes 1-flowered, then often with an abortive axis or flower-bud opposite the bract; pedicels slender, erect, the lowest ultimately 4 in. long; bracts very small, obtuse, basifixed; bracteoles 0. *Calyx* 2-lobed; lobes slightly unequal, ovate-obtuse or sub-orbicular, in fruit adpressed to the capsule, 1 in. long. *Corolla* yellow, 2 in. across; spur cylindric-conical, twice as long as lower calyx-lobe and slightly exceeding lower lip of corolla, which has an entire margin and embraces the base of the spur. *Capsule* almost globose, 15 in. in diam. *Seeds* sub-trapezoid-discoïd, margin thin, spreading, minutely crenulate. A. DC. Prod. VIII 7; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. diantha*, Roem. & Schult. Syst. Veg. I. 169; Wight Ic. t. 1569; Oliv. Journ. Linn. Soc. III. 175. *U. diflora*, Roxb. Hort. Beng. 4. *U. biflora*, Roxb. Fl. Ind. I. 143, nec alior. *U. Roxburghii*, Spreng. Syst. I. 52. *U. elegans*, Wall. Cat. 1502. *U. pterosperma*, Edgew. Proc. Linn. Soc. I. 352.

PERAK: Sunga Ryah, *King's Collector* 891! 4383! *Ridley*! SINGAPORE: *Ridley*. PROV. WELLESLEY: *Ridley*! JOHORE: Parit Lombong, *Ridley*! PAHANG: Kwala Pahang, *Ridley*! NICOBARS: Kamorta, *Kurz*! —DISTRIB. S.E. Asia, N. Australia.

2. *UTRICULARIA FLEXUOSA*, Vahl Enum. I. 198. A floating water-weed with submerged divided capillary leaves, the segments interspersed with bladders; occasionally with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, scattered or sometimes whorled near or occasionally above the base of the scapes. *Scapes* 3 to 10 in. long, 3-12-flowered; pedicels stout, reflexed, and slightly thickened under the calyx in fruit, ultimately 3 to 5 in. long; bracts ovate-acute, basifixed; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-sub-acute, in fruit patent, 25 in. long. *Corolla* yellow, rarely white, 3 to 5 in. across; spur somewhat longer than lower calyx-lobe, and about as long as lower lip of corolla, stoutish, bluntish, straight or somewhat curved. *Capsule* compressed, sub-globose, 25 in.

long. *Seeds* thickly discoid, margin thin, incurved towards the concave face, usually 5-6-angled. Bl. Bijdr. 739; A. DC. Prod. VIII. 24; Oliv Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. australis*, R. Br. Prod. 430; A. DC. Prod. VIII. 6. *U. fasciculata*, Roxb. Fl. Ind. I. 143; Wall. Cat. 1499; A. DC. Prod. VIII. 7; Wight Ic. t. 1568; Miq. Flor Ind. Bat. Suppl. 246. *U. confervifolia*, Don Prod. 84, A. DC. Prod. VIII. 8. *U. inaequalis*, Benj. Linnæa XX. 304. *U. Blumei*, Miq. Fl. Ind. Bat. II. 994. *U. extensa*, Hance in Walp. Ann. III. 3.

MALACCA: *Ridley*! PAHANG: Kwala Pahang, *Ridley*! PERAK. *Scortechini*! Durian S. Batang, *King's Collector* 1036! SINGAPORE. *Ridley* 5642, 9844! KEDAH: Langkawi, *Curtis*!—DISTRIB. S. E. Asia, N. Australia.

*Forma gracilis*, Oliv. Journ. Linn. Soc. III. 175 (= *U. inaequalis*, Benj.) more slender in all its parts and with smaller paler yellow flowers.

SINGAPORE: *King's Collector* 1165! *Hullett* 36! 385! MALACCA *Cuming*! *Goodenough* 1407! *Ridley*! PROV. WELLESLEY: *Ridley*!

The very similar and nearly allied *U. stellaris*, distinguished most easily by the presence of a cluster of oblong vesicles about the middle of the peduncle, has not been reported so far from the Malayan Peninsula.

*King's Collector's* field note on the slender form, which the writer agrees with Oliver in considering no more than a form of *U. flexuosa*, is as follows: "Herbaceous plant, in clear pools of fresh water; colour bright green. Flowers pale yellow. I sent a similar one from Durian S. Batang, but I don't think the same" His field-note on genuine *U. flexuosa* is as follows. "Growing in muddy pools of water, colour a dark reddish-brown, tinged with green; flower bright yellow."

In his interesting paper on the *Utricularias* of the Malay Peninsula (*Journ. Bot.* for 1895, pp 10, 11) Mr. Ridley gives as localities for *U. flexuosa* Pahang and Kedah, Langkawi, but does not differentiate the two forms. The leaves, he remarks, are used in medicine by the Malays, who call it Lumut Ekoi Kuching (Cat's Tail Moss) or Lumut Ekoi Kuning (Yellow Tail Moss).

3 *UTRICULARIA PUNCTATA*, Wall. Cat. 2121. A floating water-weed, with submerged divided capillary leaves, the segments interspersed with bladders, often with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, near the base of the scapes. *Scapes* 4 to 12 in., usually many-flowered; pedicels slender, ascending or sub-erect in fruit, ultimately .5 to .6 in. long; bracts ovate, more or less acute, slightly produced beyond base, bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-rotund, obtuse, .1 in. long. *Corolla* blue, reddish-purple or pink, .25 in. across, spur somewhat longer than lower calyx-lobe, shorter than lower lip of corolla, thick, sub-cylindric, obtuse. *Capsule* thin, ovate-oblong, obtuse, .2 in. long. *Seeds* discoid, peltate,



margin winged throughout, wing deeply, sharply toothed. A. DC. Prod. VIII. 5; Wight Ic. t. 1570; Oliv. in Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10.

PAHANG: Chenei Lake, Fox!—DISTRIB. Borneo, Tenasserim.

4. *UTRICULARIA BIFIDA*, Linn. Sp. Pl. 26. A slender erect weed of wet places; leaves radical, linear-spathulate, disappearing before flowering, .3 to .5 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 2 to 10 in. long, 2-many-flowered, beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, in flower .12 in., in fruit .2 in. long, recurved and distinctly winged from the decurrent calyx, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate-obtuse, .25 in. long. *Corolla* yellow, .25 in. wide; spur longer than the lower calyx-lobe and as long as the lower lip of the corolla, slightly falcate. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, testa lax, scrobiculate, obliquely striate. A. DC. Prod. VIII. 21; Oliv. Journ. Linn. Soc. III. 182; Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 10. *U. biflora*, Wall. Cat. 1498 (not of Roxb.). *U. diantha*, A. DC. Prod. VIII. 21 (not of Roem. & Schult.). *U. Wallichiana*, Benj. Bot. Zeit. 1845 214 (not of Wight). *U. brevicaulis*, Benj. Linnæa XX. 303.

PENANG: Curtis! SELANGOR. Ridley! PERAK: Larut, Scortechini! Selama, growing among grass in swampy places, Wray 4263! Ridley! PROV. WELLESLEY: in wet and swampy places, King's Collector 1616! SINGAPORE: in wet, sandy hollows, Kurz 2973! Ridley! MALACCA: Griffith! Hervey! Ridley! PAHANG: Kwala Pahang, Ridley 1481! KEDAH: Curtis.—DISTRIB. Throughout E. and S.E. Asia.

Mr Ridley has seen specimens of this species from the Dindings and from Penang, also from Kedah, Langkawi. He finds two rather distinct forms, a small-flowered, plain yellow one and a form with larger flowers over .25 in. long with a darker orange centre; this latter Ridley found in Pahang growing with the common form.

5. *UTRICULARIA AFFINIS*, Wight; var. *Griffithii*, Oliv. Journ. Linn. Soc. III. 179. A slender erect weed of wet places. *Leaves* radical, linear or linear-spathulate, obtuse, very often persisting during flowering, .5 to .7 in. long, roots fibrous, sometimes with a few bladders. *Scapes* 5 to 12 in. long, usually many-flowered; beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, .1 in. long in flower, in fruit .15 in. long and slightly winged by the decurrent calyx, erect or ascending, never recurved and rarely patent, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate or sub-orbicular, acute or sub-cuspidate, .25 in. long. *Corolla* blue with whitish lines, .25 in. wide; spur slightly longer than the lower calyx-

lobe and the lower lip of the corolla. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, reticulate, cells of the testa sub-hexagonal. *U. Griffithii*, Wight Ic. t. 1576; Ridl. Journ. Bot. XXXIII. 10. *U. caerulea*, Benth. Fl. Hongk. 256 (not of Linn.).

MALACCA: *Griffith*! *Ridley*! PERAK: *Scortechini*! SINGAPORE: *Hullett*! *Ridley*!—DISTRIB. China, Burma, Tenasserim, Borneo.

There are only shrivelled leaves on Ridley's and Wight's specimens, which are mostly in fruit; Scortechini's specimens, which are in flower, have numerous radical grassy linear-spathulate obtuse leaves, .5 in. long or rather longer. Mr. Ridley, in all probability rightly, considers that this is entitled to specific rank apart from *U. affinis*.

6. *UTRICULARIA MINUTISSIMA*, Vahl Enum. I. 204. A very small erect weed of wet places; leaves 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* capillary, rigid, branched, 2 to 3 in. long, quite glabrous, or with a few rigid scattered black hairs; racemes 2-5-flowered, beset with a few basifixed ovate-acute empty bracts or scales; pedicels very short, in fruit only .05 in. long, occasionally like the upper calyx-lobe with a few straight black hairs, sub-patent, with small lanceolate basifixed bracts and bracteoles, less than half as long as their pedicels. *Calyx* 2-lobed, lobes sub-equal wide-oblong, obtuse, in fruit .1 in. long. *Corolla* mauve, .15 in. wide; spur wide-conic-cylindric, thrice as long as lower calyx-lobe and twice as long as lower lip of corolla. *Capsule* oblong, .07 in. long, covered by the calyx. *Seeds* minute, ovoid, obscurely scrobiculate. A. DC. Prod. VIII. 16; Oliv. Journ. Linn. Soc. III. 190; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11.

PERAK: *Larut*, *Scortechini* 1501! PAHANG: *Kwala Pahang*, *Ridley* 1474c in part! MALACCA: *Koeng*; on Mount Ophir, *Ridley*.

This small plant, collected by Scortechini with no note of colour, and stated by Ridley to have mauve flowers, is here identified with *U. minutissima*, Vahl, from description only. The branched capillary stems render it very like and very liable to be mistaken for small specimens of *U. verticillata*, which has, however, longer pedicels and bracts produced below their point of insertion. The presence of hairs on the stems, pedicels, and sometimes the calyx, at once suggests a reference to *U. hirta*, which is undoubtedly its nearest affinity. The scape, however, appears never to branch in *U. hirta*; the flowers in that species are larger and fewer; the pubescence, too, when present in *U. minutissima*, which is not always the case, is very different, consisting of rigid patent black bristly hairs, whereas in *U. hirta* the hairs are soft and grey or tawny. The seeds of the two species are very similar, but those of *U. minutissima* are smaller and yet have fewer- and larger-meshed sub-hexagonal reticulations.

7. *UTRICULARIA WALLICHIANA*, Wight Ic. t. 1572, fig. 1. A very slender herb growing in wettish fields and damp grassy places; stems

twining, thin, 6 to 8 in. long. *Leaves* linear-spathulate, absent at time of flowering; bladders not seen. *Flowers* small, racemose or subspicate at ends of stems; pedicels sometimes absent, sometimes up to .25 in. long; bracts lanceolate, acute, basifixed. *Calyx-lobes* ovate, acute, .15 in. long, in fruit .2 in. long. *Corolla* yellow; upper lip obovate, lower rounded, .2 in. wide; spur straight or slightly incurved, .2 in. long. *Capsule* sub-globose, enclosed within calyx-lobes, upraised on the sub-erect fruiting pedicels. *Seeds* ellipsoid, scrobiculate but not glochidiate or papillose. Oliv. in Journ. Linn. Soc. III. 182; Clarke in Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 11. *U. scandens*, Benj. in Linnæa XX. 309 chiefly. *U. macrolepis*, Wight Ic. t. 1580, fig. 2. *U. capillacea*, Thw. Enum. 171 (not of Oliv.).

MALACCA: Mount Ophir, at 4,000 feet elevation, growing among grasses, Ridley!—DISTRIB. Throughout India.

8. *UTRICULARIA INVOLVENS*, Ridl. Journ. Bot. XXXIII. 11. A tufted herb forming mats of leaves on rocks in streams; stems twining, fairly stout, 12 in. long. *Leaves* thinly membranous, spathulate-linear, obtuse, 1 in. long or longer, .1 in. across. *Flowers* large, racemed at ends of stems; pedicels .5 to .75 in. long; bracts lanceolate, acute, basifixed, .1 in. long. *Calyx-lobes* oblong-ovate, .25 in. long. *Corolla* lemon-yellow; upper lip obovate, lower rounded, 2-lobed, .35 in. wide; spur straight, pendulous, acute or acuminate, .25 in. long. *Capsule* unknown.

KEDAH: Kedah Peak (Gunong Jerai), at 3,000 feet elevation, in streams and wet places, Ridley!

A very fine and remarkably distinct species

9. *UTRICULARIA VERTICILLATA*, Benj. Linnæa XX. 312. A slender erect weed of wet places. *Leaves* 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* slender, sometimes capillary, rigid, branched, 3 to 10 in. long, glabrous; beset with a few ovate scales or empty bracts, acute at both ends and produced downwards beyond point of insertion; pedicels capillary, puberulous, .2 in. long in flower, in fruit .25 in. long; bracts and bracteoles produced below point of insertion. *Calyx* 2-lobed, lobes sub-equal, sub-orbicular, in fruit .1 in. long. *Corolla* (? yellow) .15 in. wide; spur wide-cylindric, slightly exceeding lower lip of corolla. *Capsule* globose, .15 in. in diam., projecting beyond the closely adpressed calyx-lobes. *Seeds* minute, with sub-hexagonal reticulations. Oliv. Journ. Linn. Soc. III. 184; Hook. f. Flor. Brit. Ind. IV. 333; Ridl. Journ. Bot. XXXIII. 10. *U. bifida*, Wight Ic. t. 1584, f. 2 (not of Linn.).

KEDAH : Langkawi, *Curtis* ! MALACCA : *Griffith* ! PAHANG : Kwala Pahang, *Ridley* 1481 in part !

Oliver has suggested that the colour of the corolla in this species is yellow, and the fact that *Ridley* has mixed it (under his n. 1481) with *U. bifida* might be taken as corroborating Oliver's opinion. *Ridley*, in his paper on the Malay Peninsula *Utricularias*, says, however, that the flowers are pink.

10. *UTRICULARIA RACEMOSA*, Wall. ; var. *filicaulis*, Clarke in Flor. Brit. Ind. IV. 333. A slender herb of damp places. *Leaves* linear or spatulate, absent at time of flowering ; roots fibrous, bladders not seen. *Scapes* erect, very slender, 2 to 4 in. high, rarely higher, rather rigid, occasionally with a few branches, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* few scattered sessile ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the longer, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* white, from .15 to .2 in. across ; spur straight, conical or sub-cylindric, longer than lower lip of corolla. *Capsule* globose, .1 in. long, hidden by the adpressed calyx-lobes. *Seeds* minute, obscurely scrobiculate. *U. filicaulis*, Wall. Cat. 1501 ; A. DC. Prod. VIII. 21 ; Oliv. in Journ. Linn. Soc. III. 186. *U. nwea*, Vahl Enum. I. 203, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 144 ; Wight Ic. t. 1582. *U. setacea*, Wall. Cat. 6398 partly. *U. campestris*, Miq. in Pl. Hohenack. n. 596. *U. racemosa*, Ridl. Journ. Bot. XXXIII. 10 (hardly of Wall.).

MALACCA : Ayer Keroh, *Ridley* 10706 ! PAHANG : Kwala Pahang, *Ridley* 1474A ! SINGAPORE. Changi, *Ridley*. PENANG : Waterfall, *Curtis*, fide *Ridley* —DISTRIB. Indo-China, India.

This plant probably quite deserves to be considered a species distinct from *U. racemosa*, though except in its usually smaller size and its white instead of blue flowers, there is little to distinguish the two.

11. *UTRICULARIA OPHIRENSIS*, Ridl. Journ. Bot. XXXIII. 10. A herb *Leaves* linear-spatulate or spatulate, absent at time of flowering ; roots fibrous ; bladders not seen. *Scapes* erect 8 to 16 in. high, slender, rigid, often branching, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* sessile, clustered at the ends of the stems and branches in globose or oblong heads .3 to .5 in. long, .25 in. across ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the larger, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* .25 in. across, variable in colour, the lower lip rose-coloured (*Ridley*), both lips blueish with a yellow

hairy gland in the centre of the lower lip inside (*Scortechini*), or white (*Curtis, Kunstler*), or white with a yellow tinge (*Kunstler*); spur straight with an incurved tip (*Ridley*), or curved ascending (*Scortechini*), .2 in. long. *Capsule* globose or depressed-globose, hidden by the adpressed calyx-lobes, .1 in. long. *Seeds* oblong or obovate, brown, the broad end glochidiate.

PERAK: Larut, *King's Collector* 1931! 3820! Thaipeng, *Wray* 131! *Scortechini* 376! PENANG: Waterfall, *Curtis*! MALACCA: Padang Batu, *Ridley* 10091!

This species, which is here sustained on the authority of Mr. Ridley, who knows well the Malayan *Utricularias* in the field, does not differ very greatly from *U. racemosa*, Wall.; not so much indeed as does the variety *filicaulis* previously described. It matters little whether the three forms are considered specifically distinct or are treated as manifestations of one protean species. A drawing by Mr. Ridley shows pink flowers.

12. *UTRICULARIA ORBICULATA*, Wall. Cat. 1500. A slender herb growing on wet banks, rocks, or tree-trunks. *Leaves* all radical or on small offsets, persistent, orbicular or orbicular-spathulate, .15 in. across; petioles distinct .15 to .25 in. long; roots fibrous, sometimes with bladders. *Scapes* erect, sub-capillary, 2 to 5 in. long; usually 2-4-flowered, sometimes 6-10-flowered; naked or with one or two empty scales, slightly produced at the base; flowers on capillary pedicels .15 to .25 in. long, rather distant; bracts and bracteoles minute, ovate-acute. *Calyx* 2-lobed, the lower lobe very much smaller than the upper, both obtuse, the upper often emarginate, .12 in. long in fruit and about as broad as long. *Corolla* pale violet or white with a yellow centre, .2 to .25 in. wide, with an explanate 5-lobed lower lip and a linear sub-acute spur .2 in. long about as long as the lower lip. *Capsule* globose, .1 in. across, covered by the upper calyx-lobe but projecting beyond the lower. *Seeds* minute, obovoid, glochidiate throughout the upper thicker half. A. DC. Prod. VIII. 18; Oliv. Journ. Linn. Soc. III. 187; Dalz. & Gibs. Bomb. Flor. 136; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11. *U. pusilla*, Grah. Cat. Bomb. Pl. 165. *U. glochidrata*, Wight Ic. t. 1581.

KEDAH: Telayah Tujon, *Curtis*! PERAK: Larut, *Scortechini* 376! on Gunong Bubu, growing on steep side of hill in the sun, amongst moss, at 5,000 feet, flower pale violet; *Wray* 3880! on Gunong Mas, at 5,000 feet, flower white with yellow centre; *Wray* 4146! MALACCA: Mount Ophir, *Griffith*; *Ridley*!—DISTRIB Throughout S.E. Asia.

Order LXXXVII. BIGNONIACEÆ.

Trees or climbing shrubs, more rarely herbs. *Leaves* opposite, rarely whorled or alternate, entire or 1- 2- 3-pinnate or digitate; leaflets entire or sometimes toothed. *Inflorescence* of terminal racemes or panicles; bracts various; flowers showy, usually large, hermaphrodite, irregular or regular. *Calyx* gamosepalous, campanulate, truncate or spathaceous or 2-5-lobed, valvate. *Corolla* gamopetalous, tubular-ventricose, mouth 2-lipped; lobes 5, sub-equal, patent or erecto-patent, bilabiate imbricate in bud. *Stamens* alternate with the corolla-lobes, inserted on the tube, 5 or more usually 4 from the fifth being absent or rudimentary; filaments filiform, often slightly thickened and sometimes hairy at the base; anthers 2-celled, included or shortly exsert; cells oblong or linear, parallel or divergent, dehiscing longitudinally. *Disk* hypogynous, cushion-like or annular, sometimes absent. *Ovary* sessile or shortly stalked, superior, 1-2-celled; style long, filiform; stigma of 2 flattened ovate or oblong lobes; ovules numerous, usually horizontal, anatropous, inserted in 2 to many rows in vertical lines along the edges of the septum in each cell. *Fruit* generally an elongate capsule, loculicidally or septicidally bivalved; the septum enlarged in fruit, deciduous together with the placentas. *Seeds* transverse, affixed by their margins to the septum or to enlarged placentas, vertically compressed, discoid or trigonous, often with a broad wing, embryo usually enveloped in a fine interior membrane; exalbuminous, cotyledons flattened, sometimes folded, radicle stout, lateral.—**DISTRIB.** Tropical regions of the world, a few in warm temperate regions; absent from Europe, the Mediterranean region and New Zealand. Species about 50.

Stamens 5; a tree with opposite 2-3-pinnate leaves and very large flat capsules .. .. 1. *Oroxylum*.

Stamens 4; trees.—

Anther-cells 2, both perfect:—

Leaves 1-3-pinnate:—

Calyx spathaceous, split on one side .. .. 2. *Dolichandrone*.

Calyx lobed or truncate.—

Septum of the capsule cylindric, spongy:—

Septum prominently pitted; seeds trigonous, transversely grooved without, inner lobe fitting into the septum-pit, ovules 2-seriate in each cell.. .. 3. *Stereospermum*.

Septum only faintly pitted; seeds flat; ovules many-seriate in each cell .. .. 4. *Radermachera*.

Septum flat, capsule winged; a large tree with large flowers .. .. 5. *Pajanelia*.

- Leaves simple, often verticillate; calyx usually more or less bilabiate .. .. 6. *DIPLOANTHERA*.  
 Anther-cells 1 perfect, 1 reduced to a small hook; a tall tree with 2-3-pinnate leaves and very long narrowly-linear corollatube.. .. 7. *MILLINGTONIA*.

### 1. *OXYLUM*, Vent.

A glabrous tree. *Leaves* opposite, large, 2-3-pinnate; leaflets entire. *Flowers* large, in a long, stout, terminal raceme. *Calyx* large, leathery, campanulate, truncate or obscurely toothed, persistent. *Corolla* large, fleshy; tube campanulate-ventricose; lobes 5, 2 in upper, 3 in lower lip, recurved, toothed, crumpled. *Stamens* 5 inserted near base of tube, posterior one the shortest. *Anthems* 2-celled; cells parallel, oblong. *Disk* large, cushion-like. *Ovary* sub-sessile, contracted at the base, compressed; style slender; stigma 2-lobed; ovules in 4 vertical rows on each placenta, very many. *Capsule* very large, broadly linear, compressed parallel to the septum, septifragally 2-valved. *Seeds* very many, flattened, surrounded by a broad hyaline wing.—*DISTRIB.* A single S.E. Asiatic species.

*OXYLUM INDICUM*, Vent. Dec. Gen. Nov. 8 (1808). A small tree, reaching 30 to 40 feet in height, with a clean bole and few branches or often none, the head bearing leaves only; branches thick; bark somewhat fleshy; pith large. *Leaves* extremely large, 1-3-pinnate, the lower 3-, middle ones 2-, upper 1-pinnate; 3 to 5 feet long, triangular in outline; rachis smooth, striate, stout, swollen at the base (pulvinus) and joints; primary pinnae about 45 pairs, the lower ones 2-pinnate at base, pinnules 3- to 5-foliate; leaflets ovate, entire, acuminate at apex, side ones rounded and often unequal at base, terminal one cuneate at base, 3 to 6 in. long, 2 to 2.5 in. broad; main-nerves 4 to 5 pairs; petiolules slender, .2 to .3 in. long. *Raceme* branch-like, 2 to 3 feet long, very thick, lower part prominently marked with the ovate scars of fallen pedicels; pedicels .5 in. long, stout; bracteoles fused with pedicels. *Calyx* campanulate, 1 in. long, fleshy, truncate, with 5 short teeth. *Corolla* fleshy, 2.5 in. long, yellowish; lobes much crumpled, red, villous on both sides. *Stamens* 5, shortly exsert; base of filaments woolly; anthers divergent below; connective shortly mucronate. *Disk* fleshy, cupular, somewhat lobed. *Ovary* oblong; style slender, hollow, as long as the stamens; stigma 2-lobed, lobes rounded. *Capsule* shortly stalked, concave-flat, elongate oblong, 1.5 to 2.5 feet long, 2.5 to 3.5 in. broad, scarcely .3 in. thick, margins somewhat incurved, back keeled, valves woody, septum flat. *Seeds* very many, flat, surrounded by a very thin, hyaline, shining wing, somewhat rectangular in shape, 3 in. long, 1.5 in. broad; testa membranous; cotyledons emarginate, oblong. Kurz For.

Fl. II. 237; Clarke in Hook. f. Fl. Br. Ind. IV. 378; Trimen Fl. Ceyl. III. 281; Koord. & Val. Bijdr. I. 66; Cooke Bomb. Fl. II. 327; Prain Beng. Plants II. 787. *Bignonia indica*, Linn. Sp. Pl. (1753) 625; Lamk Dict. I. 423; Roxb. Fl. Ind. III. 110; Wall. Cat. 6514. *B. pentandra*, Lour. Fl. Cochinch. 379. *Spathodea indica*, Pers. Syn. II. 173. *Calosanthus indica*, Blume Bijdr. 760; DC. Prod. IX. 177; Wight Ic. t. 1337; Dalz. & Gibs. Bomb. Fl. 161; Bureau Monog. Bign. (1864) t. 9; Miq. Fl. Ind. Bat. II. 752; Brandis For. Fl. 347. "*Palega pajaneli*," Rheede Hort. Mal. I. t. 43.

PENANG: *Curtis* 983. PERAK: *Scortechini* 1613; *King's Collector* 7033. PAHANG: common on the banks of the river from Pekan up, flowers dull brownish-purple (*Ridley* in Trans. Linn. Soc. 2nd Ser. III. 326). MALACCA: *Maingay* (K.D.) 1213.—DISTRIB. India, Ceylon, Burma, Sumatra (*Forbes* 1284), Java, and east to Cochin China.

## 2. DOLICHANDRONE, Fenzl.

Trees. *Leaves* opposite, pinnate, leaflets entire or toothed. *Flowers* in terminal racemes or panicles, few, large. *Calyx* spathaceous, cleft to the base down the front, caducous. *Corolla-tube* long or short, inflated above; lobes 5, nearly equal, crisped on the margin. *Stamens* 4, didynamous, included; *anthers* glabrous, the cells oblong, at first parallel, afterwards divergent. *Disk* annular, cushion-like. *Ovary* sessile; ovules numerous, usually many-seriate. *Capsule* elongate, terete or somewhat compressed, straight or incurved, loculicidally 2-valved, the septum often thickened and making 4 spurious cells. *Seeds* 1 to  $\infty$ -seriate on the margins of the septum, much compressed, the wing thickened or hyaline.—DISTRIB. Tropical Africa, Asia, and Australia, about 15 species.

DOLICHANDRONE RHEEDII, Seem. Journ. Bot. VIII. 380 (1870). A deciduous tree reaching 40 to 50 feet in height of stem; branchlets stout, marked with prominent leaf-scars, innovations glabrous. *Leaves* imparipinnate, 9 to 12 in. long, leaflets 2 to 4 pairs, with an end one, rachis slender; side leaflets rhomboid, unequal at base, acuminate at apex, margin entire or with few distant serratures, glabrous on both surfaces, 3 to 4 in. long, 1.5 to 2.5 in. broad, main-nerves 6 to 7 pairs, petiolule slender, articulate at base, 3 to 5 in. long; end leaflet similar, but equal at base; all nearly black when dry. *Flowers* few, usually 1 to 4 in a short terminal corymbose raceme; pedicels glabrous, 1 to 1.5 in. long. *Calyx-tube* closed in bud and beaked, spathaceous in flower, 1.5 in. long. *Corolla* white, tubular-funnel-shaped, 4 to 7 in. long; tube slender at first, then gradually expanding; lobes 1 in.



long, orenately crisped, recurved. *Stamens* 4, didynamous; filaments curved inwards; anther-cells large, oblong, divaricate. *Ovary* conical, style slender, stigma of 2 rounded lobes. *Capsule* 1 to 2 feet long, about 1 in. broad, flattened-cylindrical, faintly ribbed, septum thickened in the middle on both sides. *Seeds* very many, overlapping in many rows, rectangular (with the wings), .5 to .7 in. long, .3 in. broad, wings corky; testa membranous; cotyledons flat, deeply emarginate, the lobes nearly orbicular; radicle short. Clarke in Hook. f. Fl. Br. Ind. III. 379; Trimen Fl. Ceyl. III. 282; Koord. & Val. Bijdr. I. 69. *D. longissima*, K. Sch. in Engl. & Prantl Pflanzenfam. IV. 2B. 240, fig. 92 B-D. *Bignonia spathacea*, Linn. f. Suppl. 283. *B. longissima*, Lour. Fl. Cochinch. 380? *Spathodea longiflora*, Vent. Choix. n. 40. *S. Rheedii*, Wall. Cat. 6516; DC. Prod. IX. 206; Wight Ic. t. 1339; Bedd. Fl. Sylv. CLXVIII.; Kurz For. Fl. II. 234; Miq. Fl. Ind. Bat. II. 754. *S. ? Loureiriana*, DC. l.c. 209? *S. Diepenhorstii*, Miq. l.c. "Nir Pongelion," Rheede Hort. Mal. VI. t. 29.

PENANG: Curtis 1184. PERAK: *Scortechini* 1098; *Wray* 2501. PAHANG: in mangrove swamps (*Ridley* l.c.). MALACCA: *Griffith* (K.D.) 4066; *Mairgay* (K.D.) 1210.—DISTRIB. Malabar coast of India, Ceylon, Burma, Andaman Islands, Malay Archipelago east to New Guinea.

### 3. STEREOSPERMUM, Cham.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire or sometimes toothed. *Flowers* in large lax terminal panicles, white pink or yellow. *Calyx* ovoid, open or closed in bud, truncate or shortly unequally lobed in flower. *Corolla* campanulate or funnel-shaped; mouth bilabiate, upper lip 2-, lower 3-cleft; lobes nearly equal, rounded, crisped, toothed or laciniate. *Stamens* 4, didynamous, included fifth rudimentary; anthers glabrous, colls linear divergent. *Ovary* sessile, elongate, 2-celled; ovules numerous, 2-seriate in each cell. *Disk* cupular, fleshy. *Capsule* elongate, terete or somewhat angled, loculicidally 2-valved; septum thick, corky, cylindrical, pitted to receive the seeds in alternating cavities. *Seeds* trigonous, with a transverse groove without and a prominent ridge within, which fits into a deep pit in the septum; wings membranous, lying flat upon the septum; cotyledons folded, 2-lobed, radicle straight.—DISTRIB. Tropical Asia and Africa. About 12 species

STEREOSPERMUM FIMBRIATUM, DC. Prod. IX. 211 (1844). A large deciduous tree, reaching 70 to 80 feet in height of stem and 1.5 to 3 feet in diam.; bark grey, rough; branchlets stout, innovations and inflorescence viscid-pubescent. *Leaves* imparipinnate, 1 to 2 feet long; rachis

grooved, viscid-pilose; leaflets 7-9, side ones opposite slightly unequal at base; end one equal, oblong-lanceolate, long-acuminate at apex, rounded at base, entire, membranous, viscid-pilose at any rate when young, afterwards glabrescent on upper surface; 4 to 6 in. long, 1.5 to 1.75 in. broad; midrib slender, main-nerves about 7 pairs, curving upwards to and along the margin, reticulations prominent, transverse; petiolules of side leaflets .3 to .4 in. long, of end one 1-1.5 in., articulate. *Panicle* large, very viscid-pilose, dichotomously branched, 5 to 9 in. long and broad; peduncle short, about .5 in. long, thick, secondary peduncles 1 to 1.5 in. long; pedicels slender, about .5 in. long, bracteoles very small, subulate, early caducous. *Flowers* pale lilac, the tube rather darker. *Calyx* campanulate, viscid-pubescent without, glabrous within, .5 in. long; lobes 5, rounded, very short, long-apiculate. *Corolla-tube* funnel-shaped, .1 to .15 in. long; lobes 5, as long as tube, spreading, long fimbriate, the laciniae .025 in. long. *Stamens* 4, didynamous, filaments slender, glabrous; anther-cells linear-oblong, divaricate, recurved, .05 in. long. *Ovary* cylindric, glabrous; style slender, stigma 2-lobed. *Capsule* cylindric, more or less quadrangular, torulose, 1 to 2 feet long, .5 in. in diam.; septum thick, corky. *Seeds* trigonous, with rather thick wings; 1 in. long, .3 in. broad, deeply immersed in alternate pits in the septum. Kurz For. Fl II. 231; Clarke in Hook. f. Fl. Br. Ind IV. 383. *Bignonia fimbriata*, Wall. Cat. 6500.

JUNKSEYLON (Tongkah): Curtis 2912. PERAK Wray 3334, Scortechum 1746; King's Collector 5701. PAHANG: Ridley 1c MALACCA: Mangay (K D.) 1211.—DISTRIB. Burma.

#### 4. RADERMACHERA, Zoll & Mor.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire. *Flowers* in terminal racemes or panicles, showy. *Calyx* urceolate, open or closed in bud, entire or shortly lobed in flower. *Corolla* funnel-shaped, tube narrow, mouth more or less 2-lipped, upper lip 2-, lower 3-lobed, the lobes spreading, rounded. *Stamens* 4, didynamous, with a fifth sterile one, included; filaments slender; anthers 2-celled, the cells divaricate. *Disk* cupular, fleshy, entire. *Ovary* cylindrical, cells 2; ovules very numerous in many rows in each cell. *Capsule* slender, compressed, terete, often spirally twisted; the septum slender, continuous, cylindric or compressed, very faintly pitted and bearing on each side a double row of seeds. *Seeds* very small, rounded, flattened, resting on a very slight depression but not sunk in the septum; wings hyaline, shining; cotyledons flat, not lobed; radicle minute.—DISTRIB. Burma, the Malay Peninsula, and Malay Archipelago. About 8 species.

Leaves 1-pinnate, leaflets prominently glandular at base, capsule under 10 in. long .. .. .	1. <i>R. glandulosa</i> .
Leaves 2-3-pinnate, leaflets not glandular at base, capsule over 15 in. long .. .. .	2. <i>R. amena</i> .

1. *RADERMACHEA GLANDULOSA*, K. Sch. in Engl. & Prantl Naturl. Pflanzenfam. IV. 3B, 243 (1894). A small tree with spreading branches, reaching 15 to 30 feet in height and 6 to 12 in. in diam. of stem; branches stout, with pale brown, corky bark; branchlets smooth, with prominent oblong lenticels; innovations slightly puberulous. *Leaves* imparipinnate, 15 to 20 in. long; rachis smooth, swollen at the nodes and at the base, glabrous; leaflets 3 to 7, side ones opposite, slightly unequal at base, end one equal, all furnished with prominent large glands at the base above the petiolule, elliptic or elliptic-oblong, acute or abruptly acuminate at apex, rounded at base, entire, glabrous, chartaceous, 5 to 10 in. long, 3 to 5 in. broad; midrib slender, main-nerves 9 to 11 pairs, arching upwards to and along the margin; reticulations transverse, prominent; petiolules .3 to .4 in. long, end one 1 in. long. *Panicles* terminal and occasionally axillary, 6 to 12 in. long; peduncle often very long, branches short, scarcely .5 in. long, few-flowered; pedicels slender, .2 to .4 in. long; bracteoles minute, caducous; flowers white, shaded with pink, calyx red. *Calyx* campanulate, truncate, persistent, .15 in. long, glabrous, margin undulate only. *Corolla-tube* cylindric below for .5 in., then campanulate for nearly 1 in., 5 in. wide at mouth, glabrous without, slightly pubescent within; lobes 5, 2 upper smaller than 3 lower, .3 in. long, margins slightly crispate-ciliate. *Stamens* 4, didynamous, included; filaments slender, anther-cells linear, .1 in. long, divaricate, sterile stamen clavate. *Disk* cupular, glabrous. *Ovary* oblong; style slender, .75 in. long, stigmas 2, oblong. *Capsule* slender, terete, 6 to 10 in. long, .25 in. broad; valves thin, chartaceous, flat after dehiscence, slightly keeled on back; septum cylindric, slightly pitted, white, spongy. *Seeds* very many, flat, .6 to .8 in. long and .05 to .1 in. broad (including the hyaline often fimbriate wings); testa membranous; cotyledons flat, oblong, broader than long (.05 in.); radicle minute. *R. stricta*, Zoll., Bureau Monog. Bign. t. 28. *Spathodea glandulosa*, Blume Bijdr. 762, DC Prod. IX. 207; Miq. Fl. Ind Bat. II. 755. *Bignonia Porteriana*, Wall Cat. 6509; DC. l.c. 165. *Lagaropyxis glandulosa*, Miq. in Ann. Mus. Lugd. Bat. I. 199. *Stereospermum glandulosum*, Miq. Fl. Ind. Bat. Suppl. 565; Clarke in Hook. f. Fl. Br Ind. IV. 383; Koord. & Val. Bijdr. I. 74.

PENANG Wallich 6509; Curtis 140. PERAK: Wray 1346, 2143; Scortechini 114, 1156, King's Collector 3353, 6379, Kunstler 981. MALACCA. Manngay (K.D.) 1217; Goodenough 1960. SELANGOR: Ridley

8537. NEGRI SEMBILAN: Goodenough 1860. PAHANG: Ridley l.c.—  
DISTRIB. Burma (Lobb), Sumatra (Forbes 2663, 2693), Java, Borneo  
(Beccari 811).

2. *RADERMACHERA AMENA*, Seem. Journ. Bot. VIII. 146 (1870). A very tall tree, reaching 80 feet in height, all parts glabrous; branches thick, with prominent leaf-scars. *Leaves* 2-3-pinnate, apparently 2 feet long or longer, the lower pinnæ only again divided, the upper ones simply pinnate; rachis smooth, thick, swollen and articulate at the nodes, enlarged at foot; petiole about 6 in. long, all joints easily separating when dry: leaflets oblong-lanceolate when young, elliptic-oblong when old, shortly and abruptly blunt-acuminate at apex, rounded or attenuate at base and slightly decurrent, glabrous, entire, coriaceous, 4 to 6 in. long, 2 to 3 in. broad; midrib thick, impressed above, main-nerves about 10 pairs, joined at about .25 in. from the margin in a looped nerve, secondary nerves alternate with the main-nerves, reticulations obscure; petiolules .4 or .5 in. long, channelled above by the decurrent margins of the blade. *Panicles* much and usually trichotomously branched, rachis terete, upper branches channelled; peduncle about 5 in. long; pedicels slender; bracteoles minute, rounded; flowers white, tinted with pink outside and with yellow streaks within; the calyx dark red. *Calyx* in bud closed, in flower 2-lipped, the lips bluntly apiculate; tube and lobes equal, .3 in. long, glabrous, deciduous. *Corolla-tube* shortly cylindric at first for .2 to .3 in. long, then campanulate, glabrous; lobes nearly equal, rounded, crenulate on the margins, .2 to .3 in. long. *Stamens* 4, with an abortive fifth; filaments thickened and glandular-hairy below, slender and glabrous above; anther-cells linear, curved, divaricate, the connective prominently apiculate. *Disk* cupular, glabrous. *Ovary* oblong, flattened; style slender, as long as tube, stigma bilobed, lobes lanceolate; cells 2, ovules very many. *Capsule* slender, torulose, 12 to 18 in. long, 3 in. broad, valves thin, chartaceous, flattened after dehiscence and then .25 in. broad, keeled on the back; septum cylindric, spongy, speedily caducous, bearing on each border a row of small seeds. *Seeds* (with wings) .75 in. long, .1 to .15 in. broad, wings hyaline, rounded; testa membranous; cotyledons flat, oblong, longer than broad; radicle minute. Kurz For. Fl. II. 232. *R. gigantea* and *R. Lobbii*, Miq. in Ann. Mus. Lugd. Bat. III. 250. *Spathodea amena*, DC. Prod. IX. 208. *S. Lobbii*, Teys. & Binn. in Nat Tijdsch. XXV. 413. *Spathodea gigantea*, Bl. Bijdr. 761; Miq. Fl. Ind. Bat. I. 755; DC. l.c. 207. *Bignonia amena*, Wall. Cat. 6512 and Pl. As. Rar. II. 78. t. 183. *Lagaropyxis gigantea*, Miq. in Ann. Mus. Lugd. I. 198. *Stereospermum hypostictum*, Clarke in Hook. f. Fl. Br. Ind. IV. 384; Koord. & Val. Bijdr. I. 72.

PERAK: *Scortechini* 1496; *Wray*. MALACCA: *Griffith* (K.D.) 4070; *Maingay* 1212 (*part*). SINGAPORE: *Maingay* (K.D.) 1212 (*part*); *Caniley* 79,204.—DISTRIB. TAVOY, Java.

#### 5. PAJANELIA, DC.

A large tree, glabrous except the flowers. *Leaves* large, imparipinnate; leaflets entire, numerous. *Flowers* large, in large terminal thyrsoid panicles, dark red. *Calyx* large, ovoid and closed in bud, in flower ventricose-campanulate; lobes 5. *Corolla-tube* cylindric below, ventricose-campanulate above, wide at the mouth; limb sub-bilabrate, lobes 5, spreading, recurved, unequal. *Stamens* 4, with a rudimentary fifth, didynamous, sub-exsert; filaments slender; anthers glabrous, cells oblong, divergent. *Disk* annular. *Ovary* 2-celled, ovules on each placenta numerous,  $\infty$ -seriate. *Fruit* an elongate narrowly oblong capsule, loculicidally dehiscent, the septum contrary to the valves, the margins of the valves extended in broad wings. *Seeds* in several rows on the edges of the septum, compressed, with hyaline wings; cotyledons flat, radicle small.—DISTRIB. A single S E. Asiatic species.

PAJANELIA MULTIJUGA, DC Prod. IX. 227 (1845). A large evergreen tree, reaching 60 to 80 feet in height and 2 feet in diam. of stem; glabrous except the corolla; bark .25 in. thick, dark grey, rough; branches thick, lenticellate. *Leaves* imparipinnate, 1.5 to 3 feet long, glabrous; rachis angular; leaflets 10 to 12 pairs with a terminal one, very unequal-sided, elliptic-ovate, acute at apex, rounded at base on the upper, cuneate on the lower side, chartaceous, margins entire recurved, 4 to 8 in. long, 2.5 to 3.5 in. broad; midrib slender, main-nerves 9 on upper, 7 on lower side, reticulations transverse; petiolule stout, .2 to .3 in. long. *Panicles* thyrsoid, 12 to 18 in. long, rachis stout, fleshy, lenticellate; primary branches 1 to 2 in. long, similar, secondary di- tri-chotomously branched; pedicels .5 in. long; bracteoles minute; flowers large, pale yellow, throat purple within. *Calyx* closed in bud, in flower campanulate, 1 to 1.5 in. long; tube broad at base with keel-like folds without, lobes 5, irregular, acute. *Corolla* 2 to 2.5 in. long, cylindric below, then somewhat constricted, then ventricose-campanulate; lobes 5, unequal, at first parallel-sided, then broadening into a blunt rounded crispately crenulate limb; the upper part of the tube and the lobes, especially on the margin, grey-pubescent. *Stamens* 4 with a rudimentary fifth, didynamous; filaments slender, glabrous; anther-cells oblong, divergent. *Disk* annular, pulvinate, glabrous. *Ovary* sessile, oblong, style slender, angled, broadening upwards into a 2-lobed clavate stigma; cells 2, ovules very numerous. *Capsule* flat, lanceolate, broadly winged, the wings split, glabrous, 1 to 1.5 feet long, 2 to 2.5 in. broad; septum

transverse, quadrangular in section. *Seeds* exceedingly numerous, in many rows and imbricating, curved; furnished at either end with a very thin hyaline wing, seeds and wing reaching 1·5 in. long and ·5 in. broad; testa membranous; cotyledons obcordate, flat; radicle slender. Bureau Monog. Bign. t. 20; Kurz For. Fl. II. 237. *P. Rheedii*, Wight Ic. tt. 1343-4; Clarke in Hook. f. Fl. Br. Ind. III. 384; Bedd. Fl. Sylv. CLXIX.; Cooke Bomb. Fl. II. 333, Prain Beng Plants II. 790. *Bignonia indica*, var.  $\beta$  Linn. Sp. Pl. 871; Lour. Fl. Cochinch. 460. *B. Pajanelia*, Ham. in Trans. Linn. Soc. XIII. 316. *B. longifolia*, Willd. Sp. Pl. III. 306; K. Sch. in Engl. & Prantl Pflanzenfam. IV. 3b, 244. *B. multijuga*, Wall. Cat. 6503 and Pl. As. Rar. 1. 81, tt 95, 96. "Pajaneli," Rheede Hort. Mal. I. 44.

PENANG: Jack. PERAK: *Scortechini*; King's Collector 2616, 3958. —DISTRIB. Eastern Bengal, Burma, Andaman Islands, Malabar coast.

## 6. DIPLANTHERA, Banks & Solander.

Trees, more or less hairy. *Leaves* undivided, large, opposite or whorled. *Flowers* large, yellow, in short thick panicles among the uppermost leaves, the primary branches of the panicles shortly verticillate and densely cyme-bearing. *Calyx* campanulate, oblong and closed when young, with 2 to 5 valvate lobes connivent in flower and sometimes sub-bilabiate. *Corolla* tubular-ventricose; lobes 5, rounded, sub-equal. *Stamens* 4, didynamous, exsert; filaments involute in bud; anthers glabrous; cells linear, at first parallel, afterwards divaricate. *Disk* thick, pulvinate. *Ovary* sub-sessile, ovules densely many-seriate. *Capsule* oblong-fusiform, woody, loculicidally 2-valved; septum flat, thick. *Seeds* many-seriate, between the margins of the septum, flattened, with a broad hyaline wing.—DISTRIB. From the Malay Peninsula to New Caledonia and Australia: about 6 species.

DIPLANTHERA BANCANA, Scheffer in Nat. Tijdschr. XXXI. 334 (1870). A lofty tree; branches stout; branchlets pale brown, pubescent, marked with lenticels and prominent leaf-scars. *Leaves* chartaceous, undivided, ovate, obtuse at apex, cordate at base; margins irregularly undulate, furnished with 1 to 2 glandular pits on the upper surface at the insertion of the petiole; both surfaces slightly pubescent, especially beneath and on the nerves; 8 to 13 in. long, 5 to 8 in. broad; midrib stout, main-nerves 10 to 12 pairs, the lowest 3 close together and spreading more or less downwards or horizontally, the rest distant, irregular, often branched at two-thirds of their length, the branches all anastomosing near the margin; reticulations prominent, transverse; petiole stout, 2 to 4 in. long, base articulate. *Panicles* terminal, 4 to 5 in. in diam., tawny-villous; common peduncle 5 to 6 in. long, ·25 in. thick;

branches easily disarticulating; pedicels slender, .75 in. long; bracts leafy, spatulate, .2 in. long; bracteoles linear-subulate, .1 to .2 in. long; flowers yellow. *Calyx* campanulate, closed in bud, 5-lobed in flower, .7 to .8 in. long; often 2-labiate, the upper lip with 2 divisions of 2 lobes each, the lower 1-lobed, acute; tube puberulous without. *Corolla* tubular-ventricose, 1 in. long; lobes 5, uppermost and 2 lowest acute; side lobes broadly obtuse, margins incurved; tube glabrous except for a ring of tawny hairs at the insertion of the filaments. *Stamens* 4, filaments inserted a little above the base of the tube, involute in bud; anther-cells linear, pendulous. *Ovary* oblong; style slender; stigmas 2, lanceolate; ovules very many. *Capsule* 6 in. long, 1.2 in. broad, smooth, valves boat-shaped after dehiscence. *Seeds* 1.5 in. long, .75 in. broad, winged on 3 sides; cotyledons flat, emarginate, .15 in. long, .25 in. broad. Clarke in Hook. f. Fl. Br. Ind. IV. 385.

PENANG: *Curtis* 870, 1569. MALACCA: *Walker* 283; *Maingay* (K.D.) 1214.—DISTRIB. Bangka (*Teysmann* 7666).

#### 7. MILLINGTONIA, Linn f.

A tall tree with corky bark. *Leaves* opposite, 2-3-pinnate; leaflets entire or crenate. *Flowers* white, in terminal corymbose panicles. *Calyx* small, cupular, truncate or with 5 short teeth. *Corolla* white; tube long, slender; limb obscurely bilabiate; lobes 5, sub-equal, sub-valvate, the 2 upper connate to near the middle. *Stamens* 4, didynamous, with no rudimentary fifth, shortly exsert, inserted on the mouth of the tube; anthers 1-celled, the second cell rudimentary, hooked. *Disk* annular, cushion-like. *Ovary* sub-sessile, cylindrical-conical; style slender, stigma bi-lobed, ovules numerous, in about 4 rows on each placenta. *Capsule* linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* very many, flattened, surrounded on 3 sides by a thin hyaline wing —DISTRIB. A single S E. Asiatic species.

MILLINGTONIA HORTENSIS, Linn. f. Suppl. 291 (1781). A tall erect tree reaching a height of 80 feet and a girth of 6 to 12 feet; bark corky, deeply fissured; branches stout, drooping; branchlets somewhat slender, flattened, lenticellate; innovations and young leaves slightly pubescent. *Leaves* opposite, 2-3 pinnate, about 1.5 to 2 feet long or longer; rachis angular, channelled; leaflets ovate or ovate-lanceolate, acuminate at apex, truncate at base, membranous; glabrous when old, pubescent when young; margins entire or (in young plants and shoots chiefly) broadly crenate; 1 to 2 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces as are the 4-5 pairs of main-nerves; petiolules slender, in upper leaflets often none. *Panicles* 8 to 12 in. long, branches divaricate; rachis somewhat angular, flattened; peduncles

1 to 3 in. long; bracts and bracteoles very small, caducous; pedicels slender, .3 to .4 in. long; flowers white. *Calyx* cupular, .1 in. long, lobes very shallow, rounded, recurved. *Corolla-tube* very slender, 1.5 to 2.5 in. long, about .07 to .1 in. broad, glabrous; lobes ovate-oblong, acute, pubescent within, .5 to .6 in. long, .2 to .3 in. broad. *Stamens* inserted at the top of the tube, filaments slender, .4 to .5 in. long; anthers rounded, ovate. *Ovary* slender, style very slender, exsert, stigma-lobes ovate. *Disk* cushion-like, .05 in. high. *Capsule* about 12 to 15 in. long and .75 in. broad, acute at both ends; valves woody, septum ultimately free. *Seeds* in several rows along the margins of the septum, much overlapping, including the wing about 1 in. by .5 in.; wing narrow at the apex, hyaline. DC. Prod. IX 182, Wight Ill. 16 *bis* fig. 6, Bureau Monog. Bign. t. 8, Bedd. Fl. Sylv. Madr. t. 249, Brandis For. Fl. 347, Kurz For. Fl. II 238; Clarke in Hook. f. Fl. Br. Ind. IV 377, Cooke Bomb. Fl. II. 334; Prain Beng. Plants 788. *Bignonia Azedarachta*, Koen. Ann. Bot. I. 178. *B. suberosa*, Roxb. Cor. Pl. III. 11, t. 214 and Fl. Ind. III. 111; Wall. Cat. 6513.

MALACCA. *Mangay* (K D) 1215. SINGAPORE: *Deschamps* —  
DISTRIB. India, Burma (*vide* Kurz), Sumatra (*Miq. Fl. Ind. Bat. Suppl.* 565)

Whether the specimens were gathered from really wild trees there is nothing to show, but if Kurz is right in his statement that the cork-tree, so well known in India in cultivation, is wild in tropical forests from Martaban to Tenasserim, it may well occur in a wild state further south in the Peninsula.

## Order LXXXVIII. PEDALINEÆ.

[By D. PRAIN.]

Herbs or undershrubs. *Leaves* opposite or the upper alternate, entire toothed or lobed, stipules 0. *Flowers* irregular, solitary or, rarely, clustered or racemose, usually axillary; pedicels short; bracts minute or 0. *Sepals* 4-5, slightly connate below. *Petals* connate in a tubular-ventricose corolla, limb 5-lobed, obscurely 2-lipped, lobes imbricate. *Stamens* 4, didynamous, rarely 2. *Carpels* 2, connate in a 2-celled, rarely 1-celled ovary, ovules many or few, superposed, style filiform; stigma shortly 2-lobed. *Fruit* hard, indehiscent, or a 2- (less often 3-4-) valved capsule. *Seeds* without wings, albumen 0.—DISTRIB. Species about 40, in tropical and sub-tropical countries.

### SESAMUM, Linn.

Erect or prostrate herbs. *Leaves* opposite below, alternate above, entire toothed, lobed, or divided. *Flowers* axillary, solitary or few and



ridges inside the tube, anthers linear-oblong or sagittate, free or connivent in a cone and adhering to the stigma by the connective; cells 2, longitudinally dehiscent, sometimes produced at the base in barren spurs; pollen granular, usually spherical, with 3 pores or 2 to 3 rounded protuberances. *Disk* none, or annular or cupular, or reduced to 2 to 5 scales or glands. *Ovary* superior, free or somewhat adnate to the disk, 1-celled with 2 parietal placentas, or 2-celled with axile placentas, or of 2 distinct or partially connate carpels, ovules in each cell 2 or few or many and 2- to  $\infty$ -seriate, rarely solitary, anatropous, usually pendulous; style 1, entire or divided at the base, stigma various, usually ending in a bifid apiculus and frequently with a ring or other appendages, often viscous. *Fruit* a dry or fleshy drupe, berry or samara, or of two baccate or follicular mericarps. *Seeds* various, often compressed, sometimes winged, sometimes with a tuft of hairs at one or both ends; testa coriaceous, crustaceous or membranous, albumen hard, fleshy or scanty or none, embryo straight; cotyledons flat, concave, convolute or contorted, radicle superior.—**DISTRIB.** Chiefly tropical, genera about 110 to 120, species probably about 1000, or even more.

Anthers included, free from the stigma, cells rounded at the base; corolla-lobes usually overlapping to the left:—

*Ovary* of 2 wholly combined carpels, 1-2 celled, fruit large, usually fleshy or pulpy within, seeds without wing or pencil of hairs (coma) (Tribe I. *CARISSEÆ*) —

*Ovary* 1-celled, with parietal ovules. —

Fruit indehiscent, albumen none . . . . . 1. *WILLUGHBEIA*.

Fruit 2-valved; albumen present . . . . . 2. *CHIOCARPUS*.

*Ovary* 2-celled, with axile ovules —

Flowers 4-merous; albumen none; corolla-throat naked 3. *LEUCONOTIS*.

Flowers 5-merous, albumen present; corolla-throat with lobed scales . . . . . 4. *MELODINUS*.

*Ovary* of 2 distinct carpels, united by the style; fruit various, seeds peltate (Tribe II. *PLUMERIÆ*) —

*Calyx* eglandular within, carpels 1-2, rarely 4-6-ovuled; fruit of 2 1-seeded drupes or berries, rarely moniliform (Subtribe 1. *RAUWOLFINÆ*) —

Leaves usually whorled:—

Albumen ruminant; erect or climbing shrubs with more or less coriaceous leaves . . . . . 5. *ALYXIA*.

Albumen even; erect shrubs with fleshy or soft leaves, membranous when dry . . . . . 6. *RAUWOLFIA*.

Leaves opposite, disk none; albumen smooth 7. *HUNTERIA*.

*Calyx* glandular within:—

Carpels 2, rarely 4-ovuled, ovules on opposite sides of a thick placenta; fruit a 1- or 2-seeded drupe or berry (Subtribe 2. *CERRIERINÆ*) —

- Leaves alternate or scattered, corolla funnel shaped, large, lobes overlapping to left, fruit drupaceous, over 2 in long . . . . . 8 CERBERA
- Leaves opposite or whorled, corolla hypocrateriform, lobes overlapping to right —
- Leaves usually whorled, fleshy when green, membranous when dry; fruit drupaceous, over 2 in long 9 OCHROBIA
- Leaves opposite, membranous to subcoriaceous, fruit capsular, angled 10 KOPSIA
- Carpels 6-∞ ovuled, fruit of 2 follicular mericarps (Subtribe 3 EUPLUMERINÆ) —
- in whorls, main nerves prominent, cotyledons
- Follicles slender, long, cylindric, seeds small, oblong, with ~~long~~ hair at the ends, style filiform, stamens usually near the top of the tube 11 AISTONIA
- Follicles very large, stout, seeds large with a membranous wing, style none or minute, stamens usually at the middle of the tube 12 DYERA
- Leaves opposite —
- Follicles slender, with comose seeds, style short, cotyledons complicate 13 HOLARRHENA
- Follicles stout short with arillate non comose seeds, style filiform, cotyledons flat 14 ERVATAMIA
- Anthers included or exserted conniving in a cone around the top of the style and adherent to the stigma by a point on the connective, cells produced downwards into empty spurs, ovary of 2 distinct rarely connate carpels united by the style, fruit of 2 follicular mericarps, seeds comose at one or both ends (Tribe III ECHITIDÆ) —
- Anthers more or less exserted (Subtribe 1 PARSONSIINÆ) —
- Corolla lobes valvate, carpels connate in flower 15 PARSONBIA
- Corolla lobes imbricate, carpels separate —
- Corolla throat naked, cotyledons flat —
- Corolla rotate, connective of anthers thickened at back 16 VALLARIS
- Corolla hypocrateriform connective not thickened 17 POTISIA
- Corolla throat usually with scales rotate or hypocrateriform, cotyledons convolute 18 WRIGHTIA
- Anthers included —
- Corolla throat with 5-10 scales (Subtribe 2 NERIINÆ) —
- Corolla lobes long or tailed . . . . . 19 STROPHANTHUS
- Corolla throat naked (Subtribe 3 LECHITIDINÆ) —
- Corolla lobes valvate or overlapping to the left —
- Corolla lobes valvate tube urceolate flowers minute 20 URCEOLA
- Corolla lobes overlapping to left tube subcampanulate, flowers small 21 PARANERIS
- Corolla lobes imbricate overlapping to the right —
- Corolla minute, urceolate lobes scarcely twisted to left in bud . . . . . 22 ECDYANTHUS

Corolla hypocrateriform, lobes twisted to left in bud:—

Seeds beaked:—

Lobes of corolla not markedly spiral in bud; beak of seed with tufted coma:—

Albumen of seed present; flowers, leaves and foliicles very large .. .. 28. *CHONEMORPHA*.

Albumen of seed none; flowers, leaves and foliicles moderate-sized.. .. 24. *RYNCHODIA*

Lobes of corolla markedly spiral in bud, coma of seed decurrent on the beak .. .. 25. *ANODENDRON*.

Seeds not beaked:—

Seeds narrowed at the end, cotyledons linear:—

Albumen scanty, corolla lobes entire, rounded 26. *CLETHRONIA*.

Albumen copious, corolla-lobes fimbriate, acuminate .. .. 27. *ICHNOCARPUS*

Seeds usually broadened at the end.—

Cotyledons oblong, or linear-oblong; corolla rather large, lobes more or less rounded:—

Calyx 5-partite, lobes lanceolate; cymes corymbose —

Apex of seed slender below the tuft of the coma, foliicles terete .. .. 28. *AGANORMA*.

Apex of seed broadly flattened below the tuft of the coma, foliicles more or less flattened .. .. 29. *TRACHELOSPERMUM*.

Calyx 5-fid, lobes narrow; cymes paniculate 30. *EPIGYNUM*.

Cotyledons narrowly linear; corolla very small, lobes very oblique, usually forked .. 31. *MICRECHITES*

The following plants of this Family are cultivated, and seem to be occasionally found run wild in the Peninsula --

1. *ALLAMANDA CATHARTICA*, Linn. Mantiss II. 214 (1771). A scandent milky shrub, native of South America. It has oblanceolate acuminate leaves in whorls of 2 to 4 and large yellow flowers. *PENANG*. *G King*, *Deschamps*. *SINGAPORE* *T. Anderson*

2. *CARISSA CARANDAS*, Linn. Mantiss. I. 52 (1767). A large evergreen thorny shrub, native of India, with small white flowers and an edible fruit. *MALACCA* *Maingay*.

3. *LOCHNERA ROSEA*, Reichb. Consp. Reg. Veg. 134 (1828). A garden shrub with shining obovate leaves and white or pink flowers, common in gardens, and also found run wild on roadsides especially near the coast. It is probably native of the West Indies. *PENANG*. *Curtis* 1067

There are probably others, which, like *Pluneria acutifolia*, Poir., *Nerum Oleander*, Linn., and *Thevetia nerifolia*, Juss., are commonly cultivated in gardens in the Peninsula, but do not run wild. We have, however, seen no specimens.

Tribe I.—CARISSEÆ

1 WILLUGHBEIA, ROXB

Large sarmentose or climbing shrubs, generally bearing tendrils which are modified peduncles. *Leaves* opposite, shortly petiolate, penninerved. *Flowers* in dense, rarely in lax, axillary cymes, pedicels enlarged in fruit. *Calyx* 5-partite, eglandular. *Corolla* hypocrateriform, the mouth naked; lobes broad or linear, overlapping to the left, nearly straight in bud. *Stamens* inserted near the base of the tube, included, anthers lanceolate, the connective apiculate, the cells rounded at the base. *Disk* none. *Ovary* entire, 1-celled; style short, its top obconic or urceolate, stigma capitate or ovoid-conical, often slightly annulate at the base and slightly bifid at the apex, ovules numerous, on two parietal placentas. *Fruit* a large globose berry with a hard pericarp. *Seeds* numerous, embedded in pulp, ellipsoid, compressed, albumen none, cotyledons fleshy, thick, plano-convex, radicle short.—**DISTRIB** India, Ceylon, Burma, Malay Peninsula and Archipelago, about 12 species.

Cynies with stout peduncles and pedicels; stamens usually near the base or middle of the corolla-tube, stigma conical, on a short style (Subgenus I *ETWILLUGHBEIA*).—

Main nerves of leaves 6 to 8 pairs, leaves orbicular or elliptic, pale when dry, glaucescent beneath; corolla-lobes 1 in. long 1. *W. grandiflora*.

Main nerves of leaves 10 to 16 pairs, rather distant.—

Corolla-lobes .3 to .4 in. long, leaves scarcely coriaceous:—

Cynies few-flowered, nearly glabrous; leaves long acuminate .. .. 2. *W. ciliata*.

Cynies many-flowered, pubescent; leaves obtuse or with a short blunt tip .. .. 3. *W. oblonga*.

Corolla-lobes under .25 in. long, leaves coriaceous or nearly so.—

Main nerves flattened on lower surface of coriaceous leaves 4. *W. coriacea*.

Main nerves sharp and slender on lower surface of thinly coriaceous leaves .. .. 5. *W. firma*.

Main nerves of leaves over 20 pairs, parallel and close.—

Corolla-lobes .3 in. long, leaves thinly chartaceous, up to 10 in. long, blunt acuminate at apex .. .. 6. *W. martabanica*.

Corolla-lobes .4 to .7 in. long; leaves thinly coriaceous, hardly over 6 in. long, sharply acuminate at apex 7. *W. tenuiflora*.

Cynies with slender peduncle and pedicels; stamens near the top of the corolla-tube; stigma cylindric, seated on the obconic top of the slender style (Subgenus II *URNULARIA*).—

Main nerves of leaves under 20; corolla-lobes ovate, recurved in flower .. .. 8. *W. flavescens*.

Main nerves of leaves over 20; corolla-lobes narrowly oblong, erect in flower .. .. 9. *W. rufescens*.

1 *WILLUGHBEIA GRANDIFLORA*, Dyer in Herb Kew, Hook f. Fl Br Ind III 625 (1882) A stout climbing shrub, branchlets stout, dark brown to nearly black, tendrils woody, thick, branched. *Leaves* coriaceous orbicular or elliptic, obtuse or with a very short blunt broad acumination at apex rounded at base, glabrous and shining, pale reddish yellow on the upper surface, cinnamon-coloured, soft and glaucescent on the lower, margins slightly recurved, 3 to 5 in long, 3 to 3.5 in broad midrib stout, impressed on the upper surface somewhat flattened on the lower, main nerves 6 to 8 pairs distant, impressed above, raised beneath, at an angle of about  $60^\circ$  with the midrib, at first straight then curving near the margin to meet in an irregular intramarginal nerve, secondary nerves few and chiefly near the apex reticulations transverse, distinct but not prominent, petiole stout, rugose or corrugated, channelled above, 5 to 1 in long. *Cymes* sub-sessile crowded puberulous, bracteoles broadly ovate, ciliate pedicels stout, .05 to 1 in long buds cylindric-clavate, .15 in long flowers white, reddish at base. *Calyx* broad, thick, 1 in long lobes rounded much imbricate, obtuse, ciliate, longer than the short tube. *Corolla* tube slender .5 in long, slightly dilated near the base opposite the stamens, villous within above the stamens lobes 1 in long, oblong spatulate long ciliate on the margins rounded at tip. *Antthers* lanceolate apiculate base cordate, .06 in long filaments slender, short curved. *Ovary* broad conical style short, cylindric, unshaped at top stigma conical bifid branches slender. *Fruit* not seen. *Ancyclocladus glaucinus*, PIERRE in Bull Soc Linn Par nouv ser 98.

MALACCA *Manqay* (K D) 1047 — *DISTRIB* Borneo (*Beccari* 3335, *Haviland* 2301, 3045)

2 *WILLUGHBEIA LUDLIS*, Roxb Cor Pl III t 280 (1819), and Fl Ind II 57 A large climbing shrub, bark dark brown, tubercled, branchlets slightly angled, pale brown to dark brown, prominently lenticellate tendrils long, branched. *Leaves* chartaceous when dry, oblong or obovate-oblong, long acuminate at apex, cuneate at base, olivaceous-brown and dull on the upper surface, reddish brown and sometimes shining on the lower, margins crispately undulate, slightly recurved, 4 to 7 in long, 2.5 to 3.25 in broad midrib stout, impressed on the upper, raised on the lower surface, main nerves 12 to 16 pairs, starting at an angle of  $50^\circ$  to  $60^\circ$  with the midrib and curving upwards to anastomose near the margin secondary nerves few, chiefly near the ends, reticulations transverse, fairly prominent petiole 2 to 6 in long. *Cymes* axillary, few flowered, about as long as the petioles, peduncle stout, 1.5 in long, bracteoles ovate, acute, early caducous, leaving a prominent scar, pedicels short angular, buds oblong-clavate,

about 5 in long, flowers white or pink *Calyx*-lobes 05 to 075 in long, ovate, acute, ciliate, tube shorter than lobes *Corolla*-tube cylindric, dilated in the middle opposite the stamens, lobes lanceolate, .35 to 4 in long, ciliate on the edges *Anthems* sub sagittate, 05 in long, filaments short, bent *Ovary* conical, acute, style short, stigma conical, striate puberulous *Berry* large, sub-ovate, the size of a lemon, pericarp orange coloured, thick *Seeds* many, in a yellowish fibrous pulp, cotyledons thick, fleshy A DC Prodr VIII 321 Kurz For Fl II 165, Hook f Fl Br Ind III 623 (*in part*), Bl Bijdr 1034, Miq Fl Ind Bat II 391 *Hunteria*?, Wall Cat 9066

DINDINGS Pangkor, at Gunong Tunggyal, Curtis 1629 —DISTRIB India (Assam, Sylhet, Chittagong), Burma

3 WILLUGHBEIA OBLONGA, Dyer in Herb Kew, Hook f Fl Br Ind III 625 (1882) A large climbing shrub, branchlets very stout, obtusely angled, with pale greyish brown bark rough with close-set small lenticels *Leaves* chartaceo-coriaceous, elliptic or elliptic-oblong, obtuse at apex or with a short broad blunt or almost emarginate acumination, rounded at base or somewhat acute when young, almost auricled, both surfaces when dry dark reddish brown, opaque, margins recurved 3 to 6 in long, 1.5 to 3 in broad, midrib broad, flat on the upper, raised on the lower, surface, main nerves 10 to 15 pairs, irregularly spaced, the lower ones rather near together, the middle and upper ones further apart, starting at about 70 with the midrib and gradually curving upwards to anastomose near the margin, secondary nerves few and inconspicuous reticulations many, irregularly netted, petiole stout, 25 in long *Cymes* small, sessile, dense flowered pubescent, bracteoles ovate acuminate pedicels 05 in long, buds oblong clavate, 25 to 5 in long *Calyx* lobes ovate-oblong, ciliate, pubescent within, 075 in long, tube thick, short *Corolla* tube cylindric, 2 in long, dilated in the middle opposite the stamens, lobes 3 to 4 in long, linear oblong, ciliate at the margins *Anthems* lanceolate, apiculate, 05 in long, filaments short, curved *Ovary* glabrous, conical, style slender, stigma conical *Berry* many-seeded, oblong, pericarp leathery, rough *Seeds* ovoid, 5 in long, testa thin, cotyledons fleshy

MALACCA *Mainqay* (K D) 1089, at Ayer Panas, Goodenough 1396

4 WILLUGHBEIA CORIACEA, Wall Cat 1620 (1829), and Pl As Rar III 45 (1832) A large glabrous climbing shrub, branches stout, obscurely angled, black, enlarged at the nodes, branchlets slender, angled, smooth, tendrils slender, branched *Leaves* coriaceous, elliptic or elliptic-lanceolate, acute or shortly and bluntly acuminate at apex, cuneate or rounded at base, glabrous and shining on both surfaces when dry especially on the upper, both surfaces reddish-brown when

dry, the upper tinged with olivaceous, margins recurved, more or less cartilaginous 3.5 to 6 in long, 1.5 to 2.5 in broad, midrib stout broad, impressed above, main nerves 10 to 12 pairs, starting at 70° with the midrib, at first straight then curving to near the margin, where they are joined by small loops, raised on the upper, raised and flattened on the lower surface, reticulations obscure, more visible on the upper surface, petiole 3 to 4 in long, stout, channelled above. *Cymes* sessile, crowded, less than 1 in long, bracteoles very small, broad, obtuse, persistent, ciliate, flowers white, buds cylindric-clavate, 4 to 5 in long. *Calyx* 1.5 in long, subhemispheric, lobes rounded, obtuse, ciliate. *Corolla* thickly coriaceous, tube inflated in the middle opposite the stamens, constricted at the base and at the mouth, 1.5 to 2 in long, lobes oblong, obtuse, 2.5 in long, the margins incurved. *Anththers* ovate-lanceolate, apiculate, 0.5 in long, filaments slender, short. *Ovary* ovoid-globular, conical, glabrous. style short, 0.25 in long, stigma cylindric-conical with a broad white annulus at its base. *Berry* obovoid, 3 in long by 2.25 in in diam. yellow when ripe, pericarp thick, leathery. *Seeds* red 7.5 in long, embedded in pulp, which hardens in drying. A DC Prodr VIII 321 Hook f Fl Br Ind III 623 Miq Fl Ind Bat II 391

PINANG on Government Hill Curtis 847 Ridley 9359 PERAK *Scortechini* Knap's Collector 5331, 6976 MALACCA Griffith Mangay (K D) 1018 Curtis 3485 Derry 120 399, 461, 1190, 1198 SINGAPORE Wallich 1620, Lobb Hillebrand 511 626 Ridley 1641, 3594, 9501

5 WILLUGHBYIA FIRMA, Blume Mus Bot Lugd Bat I 154 (1850) A large glabrous climbing shrub 60 inches stout, obtusely angled, bark reddish brown or grey, smooth fissured branchlets similar, nearly quadrangular, lenticellate tendrils branched, slender. *Leaves* thinly coriaceous, elliptic to elliptic-lanceolate or elliptic-oblong, shortly and obtusely acuminate at apex, acute or cuneate at base both surfaces glabrous, shining, the upper more or less olivaceous when dry, the lower reddish brown, margin slightly recurved 3 to 5 in long, 1.25 to 2.25 in broad, midrib stout, rather impressed above main nerves 10 to 15 pairs, slender, starting at an angle of 70 to 75° with the midrib and at first straight then curving and branching so as almost to meet near the margin, prominent on the under, obscure on the upper, surface, secondary nerves few, between successive main nerves and at a different angle, reticulations distant, obscure, petiole 4 to 5 in long, stout. *Cymes* axillary, sub sessile, many flowered, not much longer than the petioles, bracteoles broadly ovate obtuse buds oblong-clavate, 3 to 4 in long, striated by the lobes of the corolla flowers white or pale yellow. *Calyx* campanulate, 1 to 1.5 in long lobes half the length, ovate,

obtuse, ciliate. *Corolla* tube cylindric, dilated in the middle opposite the stamens, 2 in long, lobes as long as or slightly longer than the tube, linear-oblong, margins sometimes incurved, glabrous. *Anthers* ovate acute, 0.3 in long, filaments slender, short. *Ovary* ovoid, acute, style short, stigma ovate-conical with a bifid tip. *Berry* ovoid or pyriform, orange-yellow, 3 to 4 in long, 2 to 2.5 in broad, pericarp thick. *Seeds* embedded in pulp, red, 5 in long or longer, elliptic-oblong, plano-concave, testa membranous, cotyledons thick. *Miq Fl Ind Bat* II 390, *Hook f Fl Br Ind III* 624, *Hook Ic Pl t* 2344, *Stapf in Trans Linn Soc Ser 2, IV* 207. *W Burbridge*, *Dyer in Kew Gard Rep* 1880, 44, 46.

KEDAH on Lankawi Island, *Curtis*. PENANG *Curtis* 1500 *Ridley* 9468. PERAK *Scortechini* 651, 2120, *Wray* 5, 594, 3208, 4176. *King's Collector* 6663, 10050, 10854. MALACCA *Giffith, Derry* 101 *Harvey, Irving* 228, *Curtis* 3476. SINGAPORE *Munton* 58. *Cantley* 95, *Ridley* 1421, 4431, 5713, 6522. *DISTRIB* Sumatra, Borneo (*Beccari* 2273, *Ridley* 9055, &c).

This species is with difficulty distinguished from *B. coriacea* but its leaves are less coriaceous, and the main nerves are usually closer and are slender and sharp instead of being broad and flattened. The fruit is edible, and the stems give a kind of gutta percha or rubber (*Curtis*). *Curtis's* specimens bear the Malay names 'Gutta Garok, Gutta Garok, 'Getah Ujol, 'Getah giep betina. The *Fl Br Ind* gives 'Gutta Singarip' after *Munton*. As *Stapf* remarks in *Hook Ic t* 2344, the Kew material shows that, in Borneo especially, there are varieties locally known by different names, and differing chiefly in the fruit, which ought to be studied on the spot.

*King's Collector* 7729 from Gunong Budo Perak, at 500 to 800 ft, seems to be a large leaved variety of this species. The leaves reach 7 in in length and 3.5 in in breadth, when dry they are greenish on the upper and shining brown on the lower surface. The flowers are in axillary cymes, and the corolla has oblong blunt lobes.

6. *WILLUGHBEIA MARIANICA*, Wall Cat 1619 (1827), and Pl As Rai III 45, t 272 (1832). A large glabrous climbing shrub, branches stout, dark brown, branchlets dark brown, lenticellate, tendrils long, branched. *Leaves* thinly chartaceous, oblong or ovate-oblong, or ovate-lanceolate, or obovate, shortly, bluntly and abruptly acuminate at the rounded apex, or with a short broad obtuse or emarginate point, acute or cuneate at base, both surfaces shining, the lower paler, margins recurved, undulate, 3 to 10 in long, 1.25 to 3.5 in broad, midrib stout, slightly channelled above, raised beneath, main nerves very many, 20 to 26 pairs more or less, parallel, at an angle of from 70° (middle) to nearly 90° (ends) with the midrib, straight to near the edge and then rather suddenly curving and anastomosing, secondary nerves very many, between and often difficult to distinguish from the main-



nerves, frequently recurrently branching, reticulations many, prominent, all more or less raised on the upper surface, petiole 25 to 5 in long, slender *Cymes* axillary, sessile, about twice as long as the petiole, dense flowered, pedicels scarcely 05 in long, pubescent, bracteoles ovate-lanceolate, sheathing the cyme branches, buds oblong-clavate, about 5 in long, flowers pink or orange-yellow *Calyx* deeply lobed, nearly glabrous, 1 in long, lobes broadly ovate, obtuse, ciliate *Corolla*-tube cylindric, slightly dilated in the middle opposite the stamens, 175 in long, slightly pubescent within, lobes oblong-falcate, obtuse, 3 in long, margins sparsely ciliate *Anthers* sagittate, the tips nearly reaching the throat of the corolla tube, filaments slender *Ovary* broadly ovoid, glabrous style slender, stigma cylindric-conical *Berry* ovoid globose, 3 to 4 in in diameter, pericarp orange yellow, thick, hard, the seeds embedded in a fibrous edible yellowish pulp *Seeds* flattened, nearly orbicular in outline, testa leathery, cotyledons thick, conform to the seed plane convex, radicle minute A DC Prodr VIII. 321, Kurz For Fl II 165 *W. dulcis*, Roxb, Hook f Fl Br Ind III 623 (*in part*) *W. dulcis*, Ridley in Trans Linn Soc Ser 2, III 319

PINANG *Curtis* 687 MALACCA *Griffith*, *Goodenough* 1450 PAHANG at Paman, near Pekan, *Ridley* 1022—DISTRIB Burma

7 WILLUGHBYIA TENUIFLORA, Dyer in Herb Kew, Hook f Fl Br Ind III 625 (1882) A large climbing shrub, branches with black bark, branchlets greyish brown, lenticellate, striate when dry, innovations puberulous *Leaves* thinly coriaceous, membranous when young, elliptic, elliptic oblong or oblanceolate, sharply and somewhat abruptly acuminate at apex, cuneate at base, both surfaces glabrous and somewhat shining when dry, the upper dark olivaceous brown, the lower bright reddish brown, margins cartilaginous, recurved, almost revolute, 4 to 6 in long 1.25 to 2 in broad, midrib slender, prominent, red, main nerves 20 to 30 pairs, very slender, the middle ones at from 70° to 80° with the midrib, the upper at a less angle, the lower nearly or quite at right angles, straight to near the margin where they branch and curve slightly, prominent beneath, less so above secondary nerves occasional, between and similar to the main-nerves, reticulations invisible except in very young leaves, petiole 5 to 6 in long, channelled above *Cymes* axillary, about twice as long as the petioles, densely crowded with many short few-flowered branches, rusty-pubescent like the calyx, pedicels and bracteoles, bracteoles ovate, acute, deciduous, pedicels 05 to 1 in long, buds oblong-clavate, elongate, reaching nearly 1 inch, flowers white *Calyx* campanulate, lobes ovate, obtuse, ciliate, 1 in long *Corolla*-tube narrowly cylindric with a nearly globular dilatation close above the base and opposite the stamens,

4 in long, villous within above the stamens, lobes 4 to 7 in long, oblong falcate, obtuse *Anthers* cordate lanceolate, 0.75 in long, filaments slender, puberulous, bent close to the back of the connective and there attached to a broad swelling *Ovary* hemispheric, top nearly truncate, style short, thick, ellipsoid stigma conical *Berry* 4 in long, "pyriform, abounding in caoutchouc, pericarp thick, leathery, seeds many, naked cotyledons pink, fleshy (*Mangay*)

PERAK *Ridley* 3075, *Wray* 3773 DINDINGS *Curtis* MALACCA (*Huffth*, *Mangay* (K D) 1049, *Curtis* 3484 *Hervey*, *Cantley* 105, *Goodenough* 1785 SINGAPORE *Ridley* 11333 — *DISTRIB* Sumatra (*van Romburgh* 469)

*Curtis* says that the caoutchouc of this species is of no use *Wray* No 3773 is a specimen in young fruit, the fruits terminal! but otherwise like other specimens. The apparently terminal fruits probably arose from the cymes of the uppermost axis the much enlarged pedicels having absorbed the rest of the small inflorescence or caused it to fall. The Sumatra specimen has a less puberulous inflorescence, but otherwise does not seem to differ.

8 WILLUGHBIA FLAVESCENS Dyer in Herb Kew Hook f Fl Br Ind III 625 (1882) A slender climbing shrub, all parts glabrous, bark dark grey, rough, with large elliptic lenticels, branchlets dull greyish or reddish brown when dry, obtusely angled, the nodes swollen, bases of fallen leaves tuberculate *Leaves* coriaceous, elliptic, shortly and bluntly acuminate at apex, rounded or sometimes shortly cuneate at base both surfaces glabrous, the upper dark greenish brown the under pale reddish brown when dry, margins cartilaginous, recurved, 2.5 to 4.5 in long, 1.25 to 2.25 in broad, midrib stout, impressed above, main nerves slender, 16 to 20 pairs, rather irregular in angle and spacing, usually at from 70 to 80° with the midrib, and curving gently to and along the margin, raised beneath, secondary nerves many, between the main nerves and similar to them, reticulations very oblique, sometimes nearly parallel to the nerves, raised beneath, petiole 4 to 6 in long, bordered by the decurrent margins of the blade *Cymes* axillary, sessile, as long as or up to twice as long as the petioles, dichotomous, branches slender, pedicels 1 in long, bracteoles minute, acute, buds conoidal at tip, 2 to 3 in long *Calyx* 0.6 in long, campanulate, with 5 deep ovate, acute, ciliate lobes *Corolla* hypocrateriform, the tube elliptic-ovoid 1.5 in long, mouth much constricted, lobes ovate-falcate, acute, recurved in flower, 1.5 in long, margins involute *Stamens* near the apex of the tube, included, ovate, filaments short, geniculate *Ovary* elliptic-ovoid, glabrous, narrowed into the 0.75 in long slender style, which is obconic at top, stigma small, cylindric, rounded at tip

Berry yellow or greenish yellow turning to red, ovoid cordate or nearly globose, 3 to 4 in in diam, pericarp thick, coriaceous, smooth. Seeds few, large, embedded in pulp, elliptic, about 6 in long by 4 in broad, testa membranous, cotyledons plano convex, thick, radicle minute. *Chilocarpus flavescens*, Kew Gard Report, 1880, 47. *Urularia flavescens*, Stapf in Hook & Pl t 2711, p 2.

PERAK *King's Collector* 7286, 7848. PROVINCE WELLESLEY *Ridley* 9389. MALACCA *Hervey*. SINGAPORE *Murton* 120, *Ridley* 6936, 10123, *Cantley* 52.

We do not propose to separate '*Urularia*' from '*Willughbeia*'. Dr Stapf has kindly explained that he proposed the new genus under the belief that the seeds were albuminous, which however he finds now they are not. The mistake arose from a fruit of another *Apocynacea* presumably one half of a follicle of a species of *Rejoua* having been mixed up with the flowering specimens of *Urularia ovatifolia*.

9 WILLUGHBEIA RUFESCENS, Dyer in Herb Kew, Hook & Pl B Ind III 626 (1882). A large climbing shrub, glabrous. Branches dark greyish brown, swollen at the nodes, obtusely angled, rough. Branchlets cinereous brown when dry, slender. Leaves coriaceous, elliptic oblong or lanceolate, very obtusely short acuminate at apex, cuneate or rounded, often unequally, at base. Glabrous on both surfaces, olivaceous brown and shining above, dull and reddish brown beneath. Margins recurved. 2 to 4 in long, 5 to 15 in broad, midrib stout, deeply impressed above, raised beneath, main nerves 20 to 25 or more (the apex ones very close and difficult to count) pairs, at an angle of about 75° with the midrib, straight to near the margin where they curve, secondary nerves many, between the main nerves and similar to them, reticulations oblique, all faint on the upper, rather thick and distinct on the lower surface, petiole 2 to 3 in long. Cymes axillary, sessile, slightly longer than the petioles with few slender short lax few flowered branches, bracteoles minute, ovate, pedicels 2 in long, slender, buds linear oblong, 25 in long, flowers yellow. Calyx under 1 in long, deeply lobed. Lobes broadly ovate, subacute, ciliate on the margins. Corolla hypocrateriform, tube ellipsoid, glabrous, 15 in long, lobes narrowly oblong, obtuse, erect when open, 15 in long, margins incurved. Anthers ovate, apiculate, filaments geniculate, slender, inserted below the middle of the tube. Ovary broadly ovoid, as long as the calyx, style short, 0.6 in long, ending in an obconic top, stigma narrow, cylindric. Berry (immature) globose, 1.5 to 2 in in diam, pericarp thick, leathery, smooth. Seeds embedded in pulp.

PERAK *Scortechini*. MALACCA *Maugay* (K D) 1092, *Hervey*. PROVINCE WELLESLEY at Krian *Ridley* 9389. SINGAPORE *Ridley* 3996, 6023, 6047, 6143. —DISTRIB. Sumatra (*Fomes* 3232).

2 CHILOCARPUS, Blume.

Sarmentose or scandent woody shrubs. *Leaves* coriaceous or chartaceous, opposite, petiolate, penninerved, the main-nerves numerous, nearly at right angles to the midrib, sometimes indistinct. *Flowers* usually small, slender, in dense axillary cymes or terminal or axillary trichotomous panicles, pedicels enlarged in fruit. *Calyx* 5-partite, the lobes short, glands none. *Corolla* hypocrateriform, the tube cylindric, slightly dilated at the insertion of the stamens, the throat without scales; lobes 5, short, broad, twisted, overlapping to the left, twisted to the right. *Stamens* inserted at or below the middle of the tube, included, anthers lanceolate, acute, the cells rounded at the base, inappendiculate. *Disk* none. *Ovary* entire, 1-celled, with 2 parietal prominent multi-ovular placentas; style short, stigma conical or ovoid, faintly bifid, ovules 2- or many-seriate on each placenta. *Fruit* a fleshy berry, ultimately hivalved, dehiscent; pericarp thick. *Seeds* embedded in pulp with fibrous and corky arils, numerous, compressed or thick, often grooved near the hilum, either with thin testa and horny albumen, or with thick granular testa and thin albumen, albumen equable or ruminant, cotyledons flat sub-foliaceous, broad or narrow, radicle elongate, terete.—*DISTRIB.* India, Burma, Malay Archipelago and Peninsula, and tropical Australia, species about 16 to 18.

The nature of the corky processes which we call "arils" above is a little difficult to understand. They are well shown in the excellent figure of the fruit of *C. suaveolens*, Bl., in t. lin. in Blume Mus. Bot. Lugd.-Bat. I, but the author gives no explanation of his drawings. We prefer to use the word aril, as it seems to us the most explanatory. When the fruits and seeds of all the species are known, it may be possible to make two genera, or, at any rate, two subgenera, according to the testa and albumen.

Flowers small, corolla-tube under .8 in. long (where known); leaves medium-sized or small, nerves not very prominent:—

Flowers in terminal or axillary cymes as long as or longer than the leaves:—

Flower-pedicels without imbricate bracteoles, only bracts at the bases of the pedicels; secondary nerves of the leaves recurrently branched.—

Leaves 2.25 to 3 in. long, thinly coriaceous; main nerves many, easily visible when dry; peduncles under 1 in. long, seeds with thin testa and horny albumen .. 1. *C. atro-viridis*.

Leaves 3 to 5 in. long, chartaceous, main nerves many, not easily seen when dry, peduncles over 1.5 in. long; seeds not known .. 2. *C. embelloides*

Flower-pedicels with many imbricate bracteoles, seeds with the testa thick and granular and the albumen thin; secondary nerves of the leaves not recurrently branched .. 3. *C. decipiens*

Flowers in axillary cymes much shorter than the leaves, flower pedicels with imbricate bracteoles —

Leaves coriaceous, more or less obovate —

Cymes nearly sessile; leaves obtuse at the apex, fruit pericarp usually tubercled without; seeds with thin testa and horny albumen . . . . . 4. *C. enervis*

Cymes on peduncles nearly 5 in long, leaves shortly apiculate, fruit unknown —

Leaves coriaceous, upper surface dull brown, lower pale when dry, main nerves nearly at right angles to the midrib, corolla lobes rhomboid falcate . . . . . 5. *C. Cantleyi*

Leaves chartaceo coriaceous, upper surface nearly black shining, lower dark greyish brown when dry, main nerves at about 75° with the midrib, corolla lobes linear falcate . . . . . 6. *C. nigrescens*

Leaves scarcely coriaceous, oblong lanceolate, fruit 2 to 2.5 in long, about 1 in broad, seeds with granular testa and thin fleshy albumen . . . . . 7. *C. minutiflorus*

Flowers rather large corolla tube 7 to 1 in long, leaves large, nerves very prominent, seeds with thin testa and horny albumen

8. *C. costatus*

1 *CHILOCARPUS ATRO-VIRIDIS*, Blume Mus Bot Lugd-Bat I 153 (1850) A glabrous slender climbing shrub, young branches not much thicker than a crow quill, pale brown, terete, sparsely lenticellate, swollen at the nodes. Leaves thinly coriaceous, narrowly elliptic-oblong or -lanceolate, shortly and bluntly caulate-acuminate at apex, cuneate at base glabrous on both surfaces, dull when dry, the upper pale brown the lower yellowish, puncticulate, margins thinly cartilaginous, slightly recurved, crispate 2.25 to 3 in and even 5 in long, 5 to 1.25 in, even 1.75 in, broad midrib prominent, impressed above, main nerves very numerous, parallel, irregularly spaced, about 25 to 30 pairs, at an angle of about 75° with the midrib, straight to the margin to meet an intramarginal looped nerve very close to it (under .05 in), secondary nerves very many, between the main nerves, recurrent from the marginal nerve and branched backwards, the branches forming the only visible reticulations, petiole 3 to 4 in long slender. Cymes very slender, terminal and axillary, reaching 2 to 4 in in length, trichotomous, peduncles 5 to 1 in long, flattened, branch peduncles slender, nearly as long, ultimate cymes corymbose or subumbellate pedicels slender, 1 to 1.5 in long, bracts leafy, caducous, one or two always at the base of each pedicel minute and scarious, buds clavate, 2 in long, tip globose, flowers deep yellow (calyx campanulate, under 1 in long, lobes ovate obtuse, margins hyaline Corolla tube short, 1 to 1.5 in long, dilated in the middle opposite the stamens, glabrous except a ring of hair within below the stamens, lobes 1 in long, falcate, broadly

notched on one side, recurved when open, acute at tip. *Anthers* very small, under .05 in. long; filaments scarcely any, pubescent. *Ovary* conoidal; style slender .05 in. long; stigma oblong, apiculate; ovules many. *Berry* ovoid, 1.75 in. long, 1.25 in. in diam., dehiscent in 2 concave valves, pericarp thick, hard, woody, smooth and yellow without. *Seeds* numerous, black, .35 in. long, .3 in. broad, oblate-globose, deeply grooved at the hilum, about one-third surrounded by an aril consisting of yellow angular corky masses and a tuft of minute net-like fibres, testa shining, thin, granular, albumen thick, horny, cotyledons ovate, obtuse, somewhat cordate, flat, .225 in. long, radicle slender, .15 in. long. Miq. Fl. Ind. Bat. II. 393, Hook. f. Fl. Br. Ind. III 626 *Hunteria* ? *atro-viridis*, Wall. Cat. 1614, A DC Prodr. VIII 351. *Winchia atro-viridis*, Kurz For. Fl. II. 170.

PERAK: on Maxwell's Hill, *Scortechini* 321, at 2,500 to 3,000 feet, *King's Collector* 6303, 8317. SELANGOR: at Batang Barjantai, *Ridley* 7563, at Kent Estate 8557 (flowers white).—DISTRIB. Tavoy, Mergui.

We do not quote "Malabar" in the distribution because we think that *Chilocarpus malabaricus*, Bedd 1c Pl Ind Or. t 175, is probably distinct from *C. atro-viridis*.

2. *CHILOCARPUS EMBELIOIDES*, King & Gamble, n. sp. A climbing shrub, branchlets slender, pale dull brown, almost smooth. *Leaves* chartaceous, elliptic-oblong, shortly acuminate at apex, narrowed somewhat unequally at base; glabrous on both surfaces and dull, the upper olivaceous when dry, margins pale, thin, crispate, 3 to 5 in. long, 1.25 to 2 in. broad; midrib slender, prominent on the lower, somewhat impressed on the upper, surface, main nerves 24 to 26 pairs, very slender, at an angle of 70° with the midrib, straight, meeting close to the margin a slender faint intramarginal nerve, secondary nerves alternate with the main nerves and joining both the intramarginal nerve and midrib, branched recurrently; reticulations obscure, petiole 2 to 4 in. long, slender, slightly rugose. *Cymes* axillary, lax, many-flowered, nearly as long as the leaves, peduncles slender, 1.5 to 1.75 in. long, branches trichotomous slender, about 1 in. long; ultimate cymules subumbellate, pedicels slender .15 in. long, bracts very small, ovate, acute, at the bases of the rachis-branches and pedicels; buds very short, clavate, tip globose. *Calyx* campanulate, .05 in. long, lobes very small, rounded, with hyaline, ciliate margins. *Corolla*-tube cylindric, 1 in long, slightly constricted at the base and the naked throat, glabrous except for a ring of white villous hairs below the stamens, lobes broad, ovate-falcate, acute, .05 to .1 in. long. *Stamens* inserted a little above the middle of the tube; anthers lanceolate, apiculate, filaments very short. *Ovary* conical, attenuated into a short style just reaching the

stamens, stigma conical *Berry* (immature) globular, smooth when fresh, wrinkled when dry *Seeds* embedded in pulp

PERAK at Haram, *Scortechini* 711

3 *CHILOCARPUS DECIPIENS*, Hook f in Fl Br Ind III 627 (1882) A glabrous slender climbing shrub, young branches twice as thick as a crow quill, terete, dull brown when dry, with numerous elongate pale lenticels, swollen at the nodes *Leaves* thinly coriaceous, narrowly elliptic oblong or -lanceolate, obtusely and often obliquely long acuminate at apex, cuneate at base, glabrous on both surfaces and olivaceous-brown, the lower paler and minutely dotted, margins slightly recurved, crispate, 3 to 3.5 in long, 1 to 1.5 in broad, midrib prominent, pale, channelled above, main nerves 20 to 25 pairs, slender, parallel, at about 75 to 80° with the midrib, straight to the margin, close to which they join an intramarginal nerve visible on both surfaces, secondary nerves many, usually alternate with the main nerves, also running to the intramarginal one, occasionally branched, but not recurrently, petiole slender, .25 in long *Cymes* terminal and axillary, 2 to 3 crotomous, forming a terminal leafy panicle up to 9 in long and 6 in broad, main peduncles 1 to 1.25 in long, successive branches gradually shorter ultimate cymes subumbellate, pedicels stout, covered with minute bracteoles spirally arranged, up to 2 in long, bracts leafy caducous, those at the bases of the branches and pedicels ovate acute, sheathing, with pale margins, flowers not known *Berry* linear oblong, cylindric, .25 in long by nearly 1 in broad, on a stout many bracteolate pedicel and calyx of ovate acute lobes, splitting when ripe, pericarp woody, minutely granular, green when fresh, reddish-brown when dry, nearly 1 in thick *Seeds* of various shapes about .5 in long, partly enclosed in a corky aril with fibres at its base, testa granular deeply furrowed as is the thin fleshy albumen, cotyledons flat, nearly orbicular, .15 in long, radicle 1 in long

PERAK at Ulu Bubong, in dense jungle at 300 to 600 feet, *King's Collector* 10017, 10268 MALACCA *Mungray* (K D) 1043, 1060 SELANGOR on Kent Estate, *Ridley* 8557

4 *CHILOCARPUS ENERVIS*, Hook f Fl Br Ind III 626 (1882) A stout woody glabrous climbing shrub, branchlets as thick as or thinner than a goose quill, pale brown when dry, obtusely angled, the nodes raised and marked by a ridge terminal buds resinous *Leaves* coriaceous, narrowly obovate or oblanceolate, rounded or very briefly apiculate or sometimes shallowly emarginate at apex, long cuneate at base, both surfaces shining, the lower very pale when dry and often minutely punctulate, the margin slightly cartilaginous, recurved, 3 to 5 in long, 1.25 to 2 in broad midrib stout prominent beneath,

channelled above; main nerves numerous, about 25 to 30 pairs, at about 80° with the midrib, faint on the upper surface, invisible on the lower; secondary nerves nearly as many as and between the main nerves, reticulations not visible; petiole .5 to .75 in. long, usually twisted. *Cymes* small, in dense axillary clusters, shorter than the petiole; pedicels very short, thick, spirally corrugated by the scars of fallen bracteoles, very much thickened in fruit, buds clavate, the tip globose; flowers minute, white. *Calyx* .05 in. long or less, deeply divided in 5 ovate, hyaline, puberulous, rounded lobes. *Corolla*-tube cylindric, slender, .3 in. long, inflated about one-third of the way up, opposite the stamens; throat naked, lobes obliquely falcate, apiculate on one side, .1 to .15 in. long. *Anthers* lanceolate, very small, rounded at the base, filaments very short. *Ovary* ovate, acuminate, stigma small, conoidal; placentas prominent. *Berry* orange-coloured, ollipsoid or obovoid, 1.5 to 2 in. long and 1 to 1.5 in. broad, pericarp thick, fleshy, smooth or much corrugated and tubercled externally, woody, dividing into two concave or flat valves. *Seeds* embedded in a fibrous pulp and enclosed in a pale orange corky lobed arillus on one side, .4 in. long, oblong or ovoid, sometimes flattened at the ends, deeply grooved at the hilum, testa black, shining, thin, albumen horny, thick, cotyledons flat, orbicular-cordate, .2 in. in diameter, radicle .1 in. long.

PERAK at Thaipeng, Kalan Tujur, &c., Wray 593, 1118, 1804, 4026, Scortechini 189, King's Collector 3203, 3786, 7532, 8328, at 100 to 500 feet, Cantley 25. MALACCA Marngay (K.D.) 1044

5. *CHILOCARPUS CANTLEYI*, King & Gamble, n sp. A glabrous climbing shrub, young branches as thick as a goose-quill, smooth, at first yellowish afterwards dark brown, obtusely angled, raised at the nodes and ridged. *Leaves* coriaceous; elliptic or oblanceolate, the apex obtuse or with a short blunt apiculus, long-attenuate at base; both surfaces dull when dry, the upper dark greenish-brown, the lower very pale greenish-yellow when fresh, punctulate, margins slightly recurved, 3.5 to 4 in. long, 1.25 to 1.5 in. broad, midrib thick, channelled above, broad and conspicuous beneath, main nerves extremely faint on the upper surface when dry, invisible on the lower, apparently about 30 pairs at nearly right angles with the midrib and with many intermediate secondary nerves, petiole about .6 in. long, channelled above. *Cymes* axillary, glabrous, on stout somewhat flattened peduncles .4 to .5 in. long, many- (about 20-) flowered, few-branched, pedicels .1 in. long, with many obtuse imbricate bracteoles which are caducous and leave rough pits behind; buds clavate, the tip obtuse; flowers yellow. *Calyx* .075 to .1 in. long, lobes elliptic-rotund, thick with hyaline margins. *Corolla*-tube cylindric, .2 in. long, dilated slightly below the middle opposite the



stamens, constricted at throat; glabrous within except at the base; lobes .15 to .2 in. long, broadly rhomboid-falcate, plicate in bud. *Stamens* in the dilated part of the tube; anthers lanceolate, rounded at base, .05 in. long, filaments slender, pubescent below, as long as anthers. *Ovary* ovate, compressed, tapering to a .075 in. long style with short subglobular stigma. *Fruit* not known.

PERAK: near Ulu Kerling, 500 to 700 feet, *King's Collector* 8823; swamps in lower Perak, *Cantley* 227. SELANGOR: at Kwala Lumpor, *Ridley* 2839; *Curtis* 2354.

*Curtis's* specimen has more narrowly lanceolate leaves and a rather longer apiculus, with more slender branches, and has also, with *Ridley's* specimen, shorter peduncles to the inflorescence, but they seem both to be correctly this species, which comes very near to *C. enervis*, but has much less slender flowers and larger inflorescence.

6. *CHILOCARPUS NIGRESCENS*, King & Gamble, n. sp. A glabrous climbing (?) shrub, branchlets rather stout, nearly black, terete, the nodes somewhat swollen and usually ridged. *Leaves* chartaceo-coriaceous, elliptic-oblong or -oblanceolate, shortly and abruptly blunt-acuminate at apex, cuneate at base, often from nearly the middle of the blade, upper surface shining, nearly black when dry, lower a little paler and greyish-brown, minutely punctulate, margins slightly recurved, 3 to 5 in. long, 1.5 to 2 in. broad, midrib rather slender, slightly impressed above, raised beneath, main nerves 12 to 16 pairs at an angle of about 75° with the midrib, nearly straight to meet an arching intramarginal nerve at about .1 in. from the edge, faint on both surfaces, secondary nerves many, often recurrently branched, reticulations obscure, petiole .5 to .6 in. long. *Cymes* axillary, up to 1.5 in. long, more or less pyramidal, crowded, peduncle stout, flattened, .3 to .5 in. long, branches 3-chotomous, short, cymules subumbellate, pedicels about .15 in. long, densely strobilate with imbricate, rounded, pale-margined bracteoles; the bracts at the bases of the branches acute and sheathing, buds clavate, .4 in. long, the tip globose. *Calyx* campanulate, .05 to .075 in. long, lobes rather deep, broadly ovate, rounded, minutely ciliate. *Corolla*-tube narrowly cylindric, dilated at about one-third of the height from the base opposite the stamens, contracted at the naked mouth, glabrous without, slightly puberulous below the stamens within, lobes linear-falcate, acuminate, much twisted, about .2 in. long. *Stamens* inserted below the middle of the tube, anthers lanceolate, apiculate, rounded at base, .05 in. long, as long as the slender curved filaments. *Ovary* conoidal, glabrous, style slender, obconic above; stigma conical. *Berry* not known.

PERAK: on Government Hill and West Hill, *Curtis* 1040, 1121, 3086.

The same number, "*Curtis* 1040," is quoted by D. Oliver in *Hook. Icon. t. 1758* (1898) as the type of *Melodinus coriaceus*, Oliver, but all our specimens have more or less the imbricated bracteoles of *Chilocarpus*, and are destitute of scales in the throat of the corolla, or of laciniae to its lobes. A comparison of the specimens of *Melodinus coriaceus* in the Kew Herbarium shows clearly that two species have been given the same number, but that the resemblance is superficial only. The real *M. coriaceus* has the leaves pale brown, and not black, when dry.

7. *CHILOCARPUS MINUTIFLORUS*, King & Gamble, n. sp. A glabrous climbing shrub; young branches thicker than a crow-quill, obtusely angled, striate, with thin scaly bark, pale when dry; nodes swollen, joined by a ridge. Leaves thinly coriaceous, elliptic or oblong-lanceolate, shortly obtusely-acuminate at apex, narrowed or almost rounded at base, upper surface green, lower waxy-white when fresh, both pale greenish-yellow when dry, margins slightly recurved, 2 to 2.5 in. long, .75 to 1.25 in. broad, midrib slender, prominent beneath, main nerves 9 to 12 pairs, at an angle of about 65° with the midrib, straight, joined at about .05 in. from the margin in an obscure intramarginal nerve, faint on both surfaces or sometimes not distinguishable, secondary nerves present, but, like the reticulations, not easily visible, petiole slender, .15 to .2 in. long. Cymes axillary, few-flowered, scarcely exceeding the petioles, peduncles very short, as are the branches and pedicels, which are sometimes enlarged and bear many imbricate bracteoles, bracts ovate-acute, sheathing, buds clavate, 1.5 in. long, the tip globose, flowers white or yellow. Calyx campanulate, .05 in. long, lobes very small. Corolla-tube inflated in the middle opposite the stamens, constricted above and below, .1 in. long, glabrous except a ring of hairs under the stamens within; lobes ovate falcate, acuminate, about .2 in. long. Anthers ovate-lanceolate, .05 in. long, nearly sessile. Ovary ovoid, tapering into a short style with conical tip. Berry on a stout pedicel, narrowly obovoid or pyriform, surmounted by a mamillate apex, splitting into 2 valves marked by slight vertical ridges, 2 to 2.5 in. long, .75 to 1.25 in. broad, pericarp thick, woody, dull green with specks when fresh, yellowish when dry. Seeds numerous, oblong, angular, .25 in. long, embedded in pulp and partly enclosed in a papery aril, sulcate at the hilum, testa granular, dark brown, albumen thin, fleshy, cotyledons ovate.

PERAK: *King's Collector* 5368, 5494, 7550, in dense jungle.

No. 5368 has broader leaves than the rest and pedicels with imbricating bracteoles, which the others only show a tendency to, but we see no reason to keep it separate.

8. *CHILOCARPUS COSTATUS*, Miq Fl Ind Bat II. 393 (1856) A stout climbing shrub, young branches as thick as a goose-quill, shining and purplish-brown when dry, sometimes obtusely angular, nodes swollen. *Leaves* chartaceous, elliptic or elliptic oblong, shortly and very obtusely acuminate at apex, attenuate at base or sometimes rounded, both surfaces glabrous, upper shining, when dry the upper greenish- or dull purplish-brown, the lower yellowish brown, margins recurved, 4 to 8 in long, 2 to 3.5 in broad, midrib stout, broad above and impressed, sharply angled beneath when dry main nerves 12 to 20 pairs, nearly parallel, very conspicuous, impressed on the upper, raised on the lower surface, starting at an angle of from  $65^{\circ}$  to  $75^{\circ}$  with the midrib and gradually curving to join in a prominent intramarginal slightly looped nerve 0.5 to 1 in from the margin, secondary nerves many, usually alternate with the main nerves but sometimes at irregular angles with the midrib, recurrent from the intramarginal nerve and branching backwards, reticulations few, oblique, inconspicuous, petiole .5 to 1 in long, bordered by the decurrent margins of the blade *Cymes* axillary, puberulous, trichotomous, reaching about 3 in in length and breadth, many flowered, apparently whorled, peduncles .5 to 1.5 in long, stout, flattened, branch peduncles 3 to 6 in long, these again branched ultimate cymes subumbellate pedicels 1 to 1.5 in long, bracts caducous bracteoles ovate acuminate, grey puberulous, the margins hyaline, at the bases of the pedicels, buds clavate with globose tips, .75 in long flowers yellowish *Calyx* campanulate, .075 in long, lobes ovate, rounded, margins hyaline minutely ciliate *Corolla* tube very slender, .7 to 1 in long, dilated a little above the base opposite the stamens, pubescent at the base within, otherwise glabrous lobes ovate lanceolate, acuminate, reaching .5 in long and about .25 in broad *filaments* lanceolate .075 in long, cells rounded at base filaments slender, as long as anthers, villous at base *Ovary* ovate, acuminate, compressed, smooth, glabrous, style slender, 1 in long, stigma ovoid apiculate *Berry* large, ovoid when young, elliptic when ripe, with a smooth boss at the apex, and flattened base, .25 to .3 in long .15 to .2 in broad, pericarp thick, orange yellow, smooth *Seeds* embedded in fibrous pulp and half surrounded by a fleshy yellow arillus, oblong subquadrate, deeply channelled at the hilum *testa* thin, brown, albumen thick, horny, cotyledons ovate orbicular, flat, radicle short (C. Maingay, Dyer, Hook f Fl Br Ind III 627)

PENANG at Ayer Etam, Curtis 475 PERAK at Sungie Larut, Wray 2428, Scortechini, King's Collector 3261, 5264, 10848 PAHANG Ridley in Trans Linn Soc Ser 2, III 319 (C. Maingay) MALACCA Maingay (K D) 1045, 1046, Curtis 3479 SELANGOR Ridley 2726

We are unable to separate *C. Maingayi* from *C. costatus*. Teysmann's specimen of the latter in the Kew Herbarium has only immature flower-buds, rather smaller than the buds of *C. Maingayi*, but some of our specimens have them in quite as immature a stage. Curtis says it gives a very white rubber.

### 3. LEUCONOTIS, Jack.

Erect or climbing shrubs. *Leaves* opposite, distantly penninerved. *Flowers* in pedunculate axillary cymes, 4-merous. *Calyx* 4-lobed or -partite, thickened at the base, eglandular or minutely glandular within. *Corolla* hypocrateriform, tube slightly dilated in the middle opposite the stamens, throat naked; lobes 4, short, overlapping to the left. *Stamens* 4, included in the tube, anthers linear-lanceolate, the cells rounded at the base. *Disk* none. *Ovary* 2-celled; style short, stigma thickened, with a very short bifid apiculus; ovules 2 to 3 in each cell, axile, laterally affixed. *Fruit* an ovoid or globose berry, pulpy within. *Seeds* 1 to 6, ovoid-oblong, testa membranous, albumen none, cotyledons thick fleshy, the inner surfaces irregular, radicle short —

DISTRIB. Malay Peninsula and Archipelago, about 6 species

*Calyx* 4 partite, lobes long linear; intramarginal nerve of leaves very prominent; ovules 3 in each cell, seeds up to 6 .. 1. *L. eugenifolius*.

*Calyx* 4-lobed, lobes short rounded, intramarginal nerve obscure, ovules 2 in each cell, seeds usually 2. —

*Corolla*-tube 25 in. long, peduncles very stout; calyx and bracteoles very thick fleshy; berry obovoid .. .. 2. *L. Maingayi*.

*Corolla*-tube 3 to 4 in. long, peduncles rather thick; calyx and bracteoles moderately large and thick; berry ellipsoid .. 3. *L. Griffithii*.

#### 1. LEUCONOTIS EUGENIFOLIUS, A. DC. Prodr. VIII. 331 (1814)

A small erect or climbing shrub, branchlets thinner than a goose-quill, dark-rusty-puberulous at first, afterwards glabrous, obscurely angled. *Leaves* chartaceous; elliptic-oblong, sometimes oblanceolate, abruptly and often obliquely obtuse-caudate-acuminate at apex, rounded at base or sometimes slightly cuneate, upper surface dull olivaceous-brown, lower surface pale yellowish-brown, minutely punctate and rusty-puberulous on the nerves; 2.5 to 4.5 in. long, 1 to 2 in. broad, main nerves 8 to 10 pairs, very prominent on the lower surface, at right angles to the midrib, straight to join in a conspicuous intramarginal nerve at nearly 1 in from the edge, the said nerve joining the midrib below the acumen, secondary nerves usually 1 or 2 between the main nerves, reticulations obscure; petiole slender, .3 to .5 in. long, rusty-pubescent. *Cymes* 1 to 1.5 in. long, erect, rusty-pubescent, usually about 6- to 12-flowered; peduncle .5 in. long; branches 3, the side ones few-flowered, the mid one usually again branched, pedicels about .2 to

3 in long, bracts leafy, linear or spatulate, 5 to 1 in long, bracteoles linear, obtuse at tip, similar to calyx lobes, buds clavate, the tip ovoid, flowers yellowish. *Calyx*-tube very short, lobes linear, 2 in long, pubescent and with few hispid hairs near the obtuse tip, slightly recurved glands few, minute. *Corolla*-tube 3 to 4 in long, glabrous except near the base inside, lobes 15 to 2 in in diameter, ovate cordate, densely pubescent, the margins incurved. *Anthers* 4, linear-lanceolate, apiculate, 15 in long, filaments 0.5 in long, slender, decurrent in the tube. *Ovary* conoidal, more or less 4 angled, glabrous or pubescent, style slender, 12.5 in long stigma globose, apiculus bifid, cells 2, ovules 3 in each cell. *Berry* ovoid, about 1.25 to 1.5 in long and 1 in in diameter, pericarp leathery, shining without, wrinkled when dry, pulp very scanty, septum thin. *Seeds* up to 6, ovoid oblong, 6 in long by 3.5 in broad, slightly grooved at the hilum, testa membranous, brown cotyledons very thick, unequal. *Miq Fl Ind Bat II* 397. *Hook f Fl Br Ind III* 628. *L. cuspidata*, Blume Mus Bot Lugd Bat I 112. *Miq l c* 398. *Melodinus p. eugenifolius*, Wall Cat 1616.

KLDAN *Canley* 230. PENANG *Wallich* 1616. *Curtis* 1061, *King's Collector* 996A, 1452. PERAK *Curtis, Wray* 629, 630, 3141, 4248, *Scortechum* 1281. SINGAPORE *Indley* 2724. — *DISTRIB* Sumatra (*Teysmann* 4053. *Beccari* 844. *Curtis* 3551. *Forbes* 1586. 2725), Borneo (*Burbridge, Beccari* 3246).

2. *LEUCONOTIS MAINGAYI*, Dyer in Herb Kew. *Hook f Fl Br Ind III* 628 (1882). A climbing shrub, branchlets stout, nearly as thick as a goose quill, nearly black when dry, obtusely quadrangular, the nodes swollen and crossed by a slender ridge joining the bases of the petioles. *Leaves* opposite or in whorls of 3, coriaceous, elliptic oblong, abruptly and obtusely caudate acuminate at apex, attenuately rounded at base, shining on the upper surface and very dark brown when dry, pale and dull on the lower, margins recurved, 3 to 5 in long, 1.5 to 2 in broad, midrib strong, channelled above, raised beneath. Main nerves 6 to 10 pairs, the lowest very near the margin and starting the rather obscure intramarginal looped nerve, to which the others, which start from the midrib at about 60°, gradually curve, secondary nerves none or very few, reticulations obliquely transverse, rather prominent, petiole 1.25 in long, channelled above by the decurrent margins of the blade, which become connivent. *Cymes* very stout, about as long as the petiole, about 15 to 20-flowered, peduncle very thick, flattened, 2.5 to 5 in long and 1.5 to 2.5 in broad, much enlarging in fruit, branches about 4, these again 2-choramously branched, very stout, as are the very short (up to 1.5 in long) pedicels, bracts ovate-acute, clasping the branches and bases of the pedicels, buds clavate, the tip conical.

*Calyx*-tube very short, fleshy; lobes 4, ovate, rounded, the two outer broader and shorter than the two inner, which are .2 in. long, all glabrous but very slightly ciliate; glands very many, very minute, in bud scarcely more than papillæ. *Corolla*-tube cylindric, .25 in. long, puberulous at the base within, lobes 4, broadly ovate, recurved, thickly puberulous, the margins incurved slightly. *Stamens* in the upper half of the tube, anthers lanceolate, apiculate, .125 in. long, filaments short, broad. *Ovary* somewhat depressed, 4-grooved, tapering to a broad .1 in. style, stigma rounded with a short apiculus, cells 2, ovules 2 in each cell. *Berry* obovoid, 1.5 to 1.75 in. long by about 1 in. in diam., pericarp thick, smooth and shining without. *Seeds* about 3, oblong, somewhat flattened, .75 in long by .5 in. broad and .25 in thick, dark brown, testa very membranous, cotyledons thick, fleshy, radicle cylindric, about .15 to .2 in. long.

SINGAPORE: *Mangay* (K.D.) 935, *Ridley* 2826, 3710, 8908

3 *LEUCONOTIS GRIFFITHII*, Hook. f. in Fl. Br. Ind. III. 628 (1882). A glabrous climbing shrub, branchlets stout, as thick as a goose-quill, obscurely angled, dark brown when dry with a few pale lenticels, ultimate ones quadrangular. *Leaves* coriaceous, elliptic-oblong, obtusely and abruptly short acuminate at apex, rounded or slightly cuneate at base, upper surface shining, pale olivaceous-brown when dry, lower dull and paler chocolate-brown, often glandular-dotted, margins recurved, 3.5 to 5.5 in long, 1.5 to 2.25 in. broad, midrib slender, impressed above, sharply prominent beneath, main nerves 5 to 7 pairs, starting at an angle of 70° with the midrib and curving upwards to meet in a faint looped intramarginal nerve, impressed above, raised beneath, fairly conspicuous when dry, secondary nerves few or none; reticulations obliquely transverso, petiole 5 to .75 in. long, bordered by the decurrent margins of the blade, which are connivent. *Cymes* axillary, erect, as long as the petiole, peduncle 5 in. long, somewhat flattened, stout, branches 3 at first, again subdividing, crowded; pedicels quadrangular, .1 to .2 in long, bracts ovate, acute, sheathing the bases of the joints and pedicels, buds clavate, the tip oblong, flowers yellow. *Calyx* .1 in long, thick at base, lobes 4, ciliate, the two outer ovate-acute, the 2 inner oblong rounded, all with many small glands at the base within and 1 to 2 fairly large ones. *Corolla*-tube cylindric, .3 to .4 in. long, glabrous except the puberulous lower third inside, lobes broad, blunt, ovate, .15 to .2 in. long. *Stamens* occupying the upper half of the tube, filaments short, broad; anthers linear-lanceolate, apiculate, .125 in. long. *Ovary* conical, 4-angled, glabrous, with an angled style and acute stigma; cells 2-ovuled. *Berry* ellipsoid, 1.5 in. long, 1 in. in diameter; pericarp leathery, smooth, shining. *Seeds* usually 2 only, on a thin

septum and with little pulp, .7 in long, 4 in broad, testa membranous, cotyledons very thick, wrinkled on the inner face, radicle small, included between the cotyledons

PERAK *Scortechini* 1475, Wray 28, 592, 1366, 4009, King's Collector 2663, 3080, Curtis MALACCA *Crispith*, Manngay (K D) 1050, 1051 SELANGOR, Ridley 1963 SINGAPORE Kurz, T Anderson 60, Ridley 2735, 9166

Ridley's specimen from Upper Bukit Mandai, Singapore, has dark rough branchlets, smaller leaves with closer main nerves and less crowded cymes, but does not seem otherwise to differ, at any rate not sufficiently to warrant its being made a variety

*F. Griffithii* is an india rubber producer, and the product is said to be good, very probably as good as that of the neighbouring *L. elasticus*, Bccc 'Nelle foreste di Borneo' pp 354 562 fig 59 and Hook Ic Pl t 2733

#### 1 *MELODINUS* Forst

Tree or scandent shrubs. Leaves opposite pinninerved the nerves thin, parallel reticulations transverse. Flowers in terminal trichotomously paniculate cymes or in axillary and condensed cymes, 5 rarely 4 merous, white or pale pink, often sweet scented. Calyx 5 partite, glandular within. Corolla hypocrateriform tube cylindric dilated more or less opposite the stamens the lobes overlapping to the left, entire or imbricate at the tips, the mouth with thick cleft or lobed scales. Stamens 5 or 4, at or below the middle of the tube, anthers included, oblong lanceolate cells rounded at the base filaments short Disk none. Ovary 2 celled style short, stigma thick bifid ovules many in each cell, axile. Fruit a globose berry, pericarp coriaceous or hard. Seeds many, embedded in pulp, albumen fleshy cotyledons thin, ovate, foliaceous radicle long - DISTRIBUTION India, Malaya, Southern China and Australasia, about 20 species

1 flowers rather large, in terminal panicled cymes, corolla lobes oblong rounded, entire (Subgenus I *LUMINOINUS*)

1 *M. monogynus*

1 flowers small, in short axillary cymes, corolla lobes dentate at tip, often imbricate (Subgenus II *PIEUROPHACEUS*)

Leaves chartaceous, both surfaces brown and nearly similar in colour, the lower only slightly paler than the upper -

Cymes scarcely longer than the petiole, 25 to 5 in long -

Corolla tube thick, not much dilated, lobes bifid, one branch bicuspidate, buds 25 in long, leaves with 20 to 30 pair main nerves.

2 *M. orientalis*

Corolla tube slender, dilated in middle, lobes bifid, one branch imbricate dentate, buds 15 to 2 in long -

Leaves rather broad, reaching 2 25 in, main nerves 10 to 15 pairs, cymes many flowered

3 *M. micranthus*.

Leaves narrow, reaching only 1.25 in broad, main nerves 18 to 22 pairs, cymes few flowered

4. *M. citrifolius*

Cymes longer than the petiole, .75 to 1 in long, leaves greenish brown when dry

5. *M. perakensis*

Leaves coriaceous, upper surface olivaceous brown, shining, lower surface pale and dull, cymes scarcely longer than the petioles, corolla lobes scarcely bifid, much oblique, fimbriate at tip

6. *M. coriaceus*

1. *MFLODINUS MONOGYNUS*, Roxb Fl Ind II 56 (1832) A large glabrous climbing shrub, young branches thinner than a goose quill, smooth, nearly cylindric, dull brown when dry. Leaves chartaceous, oblong or oblong lanceolate, acuminate at apex, cuneate or rounded at base, glabrous on both surfaces, the upper shining, the lower rather dull and paler brown when dry margins slightly recurved, somewhat cuspidate when dry, 4.5 to 6 in long, 1.5 to 2 in broad, midrib slender impressed above raised beneath main nerves about 20 pairs, slender, at about an angle of 70° with the midrib, very slightly curved to meet an intramarginal looped nerve close to the edge secondary nerves many, similar to main nerves but thinner, often forked, sometimes with recurrent branches reticulations transverse, irregular all faint on both surfaces petiole 2 to 3 in long, rather stout Cymes terminal, puberulous reaching 3 in in length (occasionally more) and 2 to 3 in in diam peduncles 0 to .75 in long branches trichotomous pedicels variable, bracts of the inflorescence and primary branches leafy, caducous, those at the bases of the branches and pedicels ovate, acute bracteoles 1 to 2, small, obtuse, on the pedicel itself, buds elongate, tip oblong, acute, flowers white, fragrant Calyx campanulate, lobes 5, oblong-orbicular, sometimes emarginate, ciliate, 1.5 to 2 in long, the margins hyaline Corolla tube cylindric, .5 to .75 in long, widening upwards, glabrous or slightly puberulous without, densely villous within, above the stamens, lobes oblong-falcate, rounded, 3 to 5 in long, more or less auricled, each with a 2 to 3-lobed glabrous scale near the base, throat with a corona of 5 bifid villous linear-falcate lobes Anthers oblong lanceolate, .06 in long, filaments slender, short Ovary rounded style slender, 1 in long stigma thick, cylindric, with a sharp bifid apiculus, very gummy, embraced by the anthers Berry globose, smooth, pulpy, reaching 3 in in diam, pericarp coriaceous, orange-coloured, smooth Seeds numerous, flattened, integuments 2, outer thick rugose, inner membranous, albumen copious, cotyledons oval A DC Prod VIII 329, Wall-Cat 1603, Wight Ic t 394, Bot Reg 834, Bot Mag t 2527, Hook f Fl Br Ind III 629, Prain Beng Plants 668 *Echaltium piscidium*, Wight Ic t 472, excl fig of fruit *Nerium piscidium*, Roxb Fl Ind II 7, excl descr of fruit



PENANG *Mangay* (K D) 1085 PERAK *Curtis* 1308 —DISTRIB India (Sikkim Himalaya, Cooch Behar, Assam, Khasia Hills and Sylhet) TINOI (*Forbes* 3708) The fruit is edible

2 *MELODINUS ORIENTALIS*, Blume Bijl 1026 (1826) and Mus Bot Luid Bat I 155, fig LII A large glabrous climbing shrub, branches smooth, rather slender, with nearly black bark, upper branchlets obscurely angled, glabrous *Leaves* chartaceous, oblong or elliptic-oblong, obtusely acuminate at apex, acute at base and often unequal, glabrous on both surfaces, upper nearly black and shining when dry, lower chocolate brown and dull, margins slightly undulate-crispate, 3 to 5.5 in long, 1 to 2.25 in broad, midrib slender, slightly impressed above, sharply raised beneath main nerves about 20 to 30 pairs, at from 60 to 70 with the midrib, curving upwards and branching to meet an obscure intramarginal looped nerve quite close to the margin, secondary nerves hardly distinguishable from main nerves, but rather more slender, sometimes with recurrent branches, reticulations irregular, obscure petiole 3 to 5 in long, bordered by the decurrent margins of the blade, which are connivent *Cymes* axillary, few (8 to 10) flowered, crowded, scarcely as long as the petioles peduncles very short or almost none, stout bracts ovate acute, sheathing the branches and the very short (0.25 in long) pedicels, which also bear a pair of rounded bracteoles below the calyx buds clavate, .25 in long, tip globose flowers white *Calyx* campanulate, thick, 1 in long, lobes half that length, ovate, rounded, puberulous *Corolla* tube thick, cylindrical, 2 in long, dilated opposite the stamens, contracted above and below, puberulous without, and within below the stamens, lobes short, obliquely ovate, bifid, one branch bicuspidate, plicate in bud, throat with 5 thick fleshy 2 lobed scales *Stamens* inserted in the middle of the tube, anthers lanceolate, apiculate, rounded at base, filaments short, slender *Ovary* conoidal, ribbed, surmounted by a slender style .05 in long and obconic above, stigma conical with a bifid apiculus *Berry* 'large, yellow (*Mangay*), "globose, red (*Blume*), apparently about .25 in in diameter *Seeds* oblong, about .8 in long and .4 in broad, testa rugose Miq Fl Ind Bat II 395, t xxxiv, A DC Prod VIII 330, Kurz in Journ As Soc Beng XLVI n 250, in note, Hook f Fl Br Ind III 629 *Hunteria cuspidata*, Wall Cat 1609, A DC l c 350 *Alycia' cuspidata*, Wall Herb *Chilocarpus cuspidatus*, Benth in Gen Pl II 698 (under *Hunteria*)

PENANG *Walluch* 1609, *Phillips*, *Mangay* (K D) 1043/2 (*Chilocarpus suaviolens*), *Curtis* 738, 2838 PERAK on Maxwell's hill, 3000 ft *Scortechini* 355, at Gopong, *King's Collector* 4530 DISTRIB Java, Sumatra (*Forbes* 1568)

3 *MELODINUS MICRANTHUS*, Hook f in Fl Br Ind III 629 (1882)  
 A climbing shrub (apparently), branchlets rather slender, terete, with nearly black bark, uppermost somewhat angular. *Leaves* chartaceous, oblong-lanceolate, obtusely acuminate at apex, attenuate at base, smooth and shining and dark reddish brown on both surfaces when dry, the lower rather paler than the upper, margins recurved, slightly undulate, 3 to 6 inches long, 1 to 2.25 in broad, midrib slender and impressed above, more conspicuous and raised beneath, main nerves 10 to 15 pairs, slender, remote, at an angle of from 50° to 60° with the midrib, and curving slightly upward to an obscure intramarginal nerve just within the edge, impressed above, secondary nerves few, reticulations transverse, oblique, petiole 15 to 25 in long, slender. *Cymes* many flowered, axillary, trichotomous, about 5 in long, peduncles 2 in long, rachis angular, bracts very small, ovate acute, with ciliate hyaline tips, pedicels 0.5 to 0.75 in long, with two bracteoles near the base of the calyx, buds clavate, tip conical globose, 15 in long. *Calyx* 0.75 in long, tube about one third of length, lobes ovate, rounded. *Corolla* tube cylindric, dilated a little above the middle, constricted above and below, 1.25 in long, pubescent within in a ring below the stamens, lobes short, unequally obtusely 2 lobed, twisted to the right, the base furnished with fleshy bifid scales closing the mouth. *Anthers* lanceolate, long-apiculate, 0.5 in long, filaments very short. *Ovary* globose, style slender, stigma conical, with a short bifid apiculus. *Fruit* not seen.

PENANG road to Sungie Penang, *Curtis* 1053 MALAC *Mamgay* (K D) 1090

4 *MELODINUS CITRII* ORMIS, King & Gamble, n sp. A slender glabrous climbing shrub, young branches rather thicker than a crow quill, dull brown when dry, with elongate lenticels. *Leaves* chartaceous, oblong-lanceolate, obtusely and often obliquely caudate acuminate at apex, cuneate at base, both surfaces glabrous, dull olivaceous brown when dry, margin slightly cusped, 3 to 4 in long, 1 to 1.25 in broad, midrib slender, main nerves 18 to 22 pairs, at rather irregular angles but usually at about 70° with the midrib, fairly straight, meeting an intramarginal nerve at less than 0.5 in from the margin, faint on both surfaces when dry, secondary nerves many, irregular, alternate with the main nerves, recurrent and forked to form the inconspicuous reticulations, petiole 25 in long. *Cymes* axillary, few-flowered, scarcely longer than the petiole, peduncle and pedicels very short, with many ovate obtuse bracteoles, which, however, scarcely imbricate, buds clavate, 2 in long, tip globose, flowers light yellow. *Calyx* 0.5 in long, campanulate, lobes very short, obtuse, hyaline on the margins. *Corolla*-

tube cylindric, dilated in the middle rather below the stamens, contracted above and below, glabrous except a ring of hairs within under the stamens, 125 in long, with 5 lobed fleshy scales closing the throat, lobes angled, falcate, fimbriate at the tip, the tip inflexed when open. *Anthers* lanceolate, apiculate, 05 in long, filaments short, pubescent at base. *Ovary* conoidal, tapering to a short style and oblong conical stigma, with a pale band at its base. *Berry* ovoid, orange, 3 to 3.5 in long, 2.5 in in diameter, pericarp smooth, shining rather thin. *Seeds* numerous, embedded in pulp, roughly oblong, 6 in long, 4 in broad, with no apparent aril, testa thick, granular, brown, deeply pitted, albumen waxy or fleshy, cotyledons oblong, 125 in long, flat, radicle thick, cylindrical, 275 in long.

PERAK in dense jungle at 500 to 800 feet, near Larut, *King's Collector* 6525

5 *MELODINUS PERAKENSIS*, King & Gamble, n. sp. A glabrous climbing shrub young branches thicker than a crow-quill, cinereous-brown, uppermost obscurely quadrangular. *Leaves* chartaceous, elliptic or elliptic oblong, shortly and obtusely acuminate at apex, attenuate at base both surfaces pale greenish-brown when dry, the upper somewhat shining and darker than the lower, margins slightly recurved, 3.5 to 5 in long 1.5 to 2 in broad, midrib slender, slightly impressed above, raised beneath main nerves slender, 10 to 15 pairs, starting at about 60° with the midrib and curved upwards to and along the margin where they meet, forming a slightly broken wavy obscure intramarginal nerve, secondary nerves few, reticulations irregular, very faint, only the main nerves easily visible. *Petiole* 1.5 to 2 in, stout. *Cymes* axillary, 7.5 to 1 in long, lax, sessile. *Branches* and 1 to 2 in long *Pedicels* slender, *bracts* ovate acute, in pairs at the branches and below the *pedicels* with 1 to 2 obtuse bracteoles on the pedicel. *Buds* clavate, 2 in long, tips globose, flowers waxy white. *Calyx* 0.5 in long campanulate, lobes broadly ovate, ciliate. *Corolla* tube cylindric, slightly inflated in the middle opposite the stamens, narrowed at the throat, lobes oblong spatulate, spreading, the apex lobed, one lobe fimbriately toothed, a large rounded gland at the base of each lobe, in the throat of the tube. *Anthers* lanceolate, cordate at base, filaments short, slender. *Ovary* broadly ovate, style slender, stigma conical with a bifid apiculus. *Fruit* pyriform, about 2 in long by 1.5 in broad, pericarp thin but woody, smooth. *Seeds* many, roughly triangular, 75 in long, testa dark brown, rugose, crustaceous, deeply pitted.

PERAK in open jungle on limestone hills, at 300 to 800 feet, *King's Collector* 4481, 7031

6 *MELODINUS CORIACEUS*, Oliver in Hook. Ic. Pl. t. 1758 (1888)

A large climbing shrub, branchlets as thick as a swan's-quill, dark reddish-brown, rough, uppermost internodes flattened or angled and with vertical lines, nodes raised and with a slight ridge. *Leaves* coriaceous, elliptic or obovate or oblong-ob lanceolate, obtuse or very slightly acute at apex, cuneate at base, upper surface olivaceous-brown, shining, lower much paler and dull, grey when dry, margins recurved, 3 to 5 in long, 1.5 to 2 in broad, midrib prominent, impressed above, raised beneath, main nerves 13 to 17 pairs, at about 60° to 70° with the midrib, nearly straight to join an obscure intra-axillary nerve, secondary nerves recurrent, branching into reticulations, all fairly distinct on the upper, indistinct on the lower surface, petiole 3 to 5 in long, channelled above. *Cymes* axillary, sessile, as long as or slightly longer than the petioles, many flowered, rachis angular, bracteoles ovate, acute, ciliate, pedicels stout, 0.5 in long, much enlarged in fruit, buds clavate, with globose tip, 2.5 in long. *Calyx* 0.5 to 0.75 in long, lobes half the length, ovate, acute, ciliate. *Corolla* tube cylindric, constricted at the mouth and near the base, dilated between, opposite the stamens, pubescent within in a ring below the stamens, glabrous without, mouth furnished with 5-2 lobulate fleshy appendages which nearly close it, lobes ovate, falcate, very oblique, the tips fimbriate dentate turned to the right. *Anthe*rs near the top of the tube, sagittate, apiculate, 0.6 in long, filaments short. *Ovary* globose, style slender, stigma conical, with a short bifid apiculus, very gunny. *Berry* ovoid or globose, 1.5 to 2.5 in in diam, pericarp yellowish, shining, tuberculate. *Seeds* many, of irregular shapes, usually ovate pyriform, testa granular, rugose, much pitted, albumen waxy, deeply pitted by the ridges of the testa, cotyledons small, oblong, 1.25 in long, radicle cylindrical, 2.5 in long. *Alyxia* 'coriacea, Wall Cat 9065, and in Roxb Fl Ind ed Carey & Wall II 540, Hook f Fl Br Ind III 635. *Hunteria* 'coriacea, Wall Cat 1610.

PENANG Wallich 1610, 9065, at Chalet, 1000 feet, Curtis 1040. PERAK open jungle near Larut, King's Collector 7499, Waterfall Hill, Wray 2074.

## Tribe II — PLUMERIEÆ

### Subtribe 1 — RAUWOLFIAÆ

#### 5 ALYXIA, B.

Shrubs, sometimes scandent, usually glabrous. *Leaves* coriaceous, in verticils of 3 to 4, rarely opposite, the nerves more or less faint. *Flowers* rather small, in small axillary or terminal cymes. *Calyx* short 4 to 5-partite, eglandular within. *Corolla* hypocrateriform, tube cylindric, slightly expanded opposite the stamens, throat naked,

lobes 5, slightly twisted, overlapping to the left *Stamens* inserted above the middle of the tube, anthers lanceolate, their bases rounded *Disk* none or obscurely annular *Ovary* of 2 distinct carpels, style filiform, stigma oblong, urceolate or capitate, pointed or somewhat bifid, ovules 2 to 6 in two series in each carpel *Fruit* of 1 or 2 drupes often pedicellate, drupes 1-seeded or with 2 to 4 one-seeded joints *Seeds* ovoid or oblong, grooved or concave on the ventral surface at the attachment to the placenta, albumen horny, deeply ruminant, presenting horizontal parallel lamellæ, cotyledons thin, leafy, ovate or oblong, straight or curved, radicle long, thick — *DISTRIB* Tropical Asia, Australia, and Polynesia about 30 to 35 species

*Drupe* 5 in long or under —

Corolla pubescent without, leaves pubescent beneath .. 1 *A pilosa*

Corolla glabrous without, leaves usually glabrous beneath —

Leaves coriaceous —

Leaves mostly over 2 in long —

Main nerves 16 to 20 pairs at an angle of 60° to 70°

with midrib .. .. 2 *A lucida*

Main nerves 25 to 40 pairs at an angle of 80° with

midrib .. .. 3 *A odorata*

Leaves mostly under 2 in long —

Main nerves 10 to 12 pairs at right angles to midrib 4 *A oleifolia*

Main nerves 15 to 20 pairs at 75° to 80° with midrib .. 5 *A pumila*

Leaves chartaceous, 2 5 to 5 in long, main nerves 27 to 30

pairs .. .. 6 *A Forbesii*

*Drupe* over 5 in long —

Leaves thinly coriaceous 4 to 6 in long, main nerves extremely numerous drupes 1 in long .. 7 *A Scortechinii*

Leaves coriaceous 3 to 4 in long, main nerves 25 to 30 pairs, flower not known, drupe 75 in long 8 *A selangorica*

1 *ALYXIA PILOSA*, Miq Fl Ind Bat II 408 (1856) A slender climbing shrub, branches stout with pale bark, branchlets thinner than a goose quill angled striate, dull brown, covered, especially the extremities with dense minute grey tomentum *Leaves* very coriaceous, opposite or more often in whorls of 3 to 4, lanceolate or elliptic-lanceolate shortly acuminate at apex, cuneate or acuminate narrowed at base, upper surface shining olivaceous, lower pale yellowish olivaceous densely short pubescent margins cartilaginous, recurved, 3 to 5 in long, 1 to 1 5 in broad, midrib very stout, very prominent on the under surface, impressed on the upper, main nerves 15 to 20 pairs, almost at right angles to the midrib, faintly depressed on the upper surface when dry, broad and pale on the lower secondary nerves many, very indistinct, as are the reticulations petiole 25 to 35 in long, thick, bordered by the decurrent margins of the blade *Cymes* axillary,

densely grey-pilose, reaching 75 to 1 in in length, peduncles stout, 25 in long, flowers subumbellately crowded, bracts at the bases of the umbels lanceolate, 15 in long, bracteoles smaller, three on each pedicel, which is scarcely 1 in long, buds clavate, the tip ovate acute, flowers yellowish white (?) *Calyx* deeply cleft, 15 in long, lobes ovate-lanceolate, densely pubescent *Corolla* tube cylindric, dilated near the top opposite the stamens, contracted at the mouth which bears inside an annular ring, 4 in long, pubescent without and below the stamens within, lobes ovate cordate, glabrous within, 15 in long *Anthers* elliptic lanceolate, apiculate, 06 in long, filaments slender *Ovary* (or the thin lobed disk surrounding and attached to it) densely villous, carpels 2, style slender, 25 in long stigma cylindric, with a bifid very short apiculus *Fruit* of 1 or 2 pedicellate oblong ellipsoid drupes, 5 in long, 35 in broad, tipped with the persistent base of the style, pericarp smooth, thin, wrinkled when dry *Seed* 1, oblong, conform to the pericarp, furrowed on one side where it is attached to the placenta, testa membranous albumen horny, deeply ruminate in closely packed horizontal lamellæ, cotyledons small, oblong, radicle long cylindric Hook f Fl B. Ind III 635

PERAK in dense jungle near the top of Gunung Malacca, at 3,500 to 4,000 feet, *King's Collector* 7170 MALACCA on Mount Ophir, *Lobb* —DISTRIB Sumatra, Borneo (*Teysmann*, *Beccari* 1685, 2121)

*Lobb's* specimen has the leaves somewhat obovate obtuse and almost emarginate at apex, but otherwise seems to be the same as the Peninsular and Sumatran specimens

2 *ALYXIA LUCIDA* Wall in Roxb Fl Ind ed Carey & Wall II 540 (1824) A glabrous twining shrub branches stout dark greyish brown sparsely lenticelled branchlets quadrangular, grey to reddish brown, shining *Leaves* pergamaceous, opposite or in whorls of three, in young branches of four, elliptic or obovate, obtuse or bluntly acute at apex cuneate at base glabrous on both surfaces, the upper shining, olive green when dry, the lower dull and pale margins cartilaginous recurved, 1.75 to 3.5 in long, 1 to 1.25 in broad midrib slender, impressed above, raised beneath, main nerves 16 to 20 pairs, slender at 60° to 70° with the midrib, straight to join an intramarginal nerve at 0.5 in from the edge or nearer, indistinct on both surfaces, less so on the lower, secondary nerves many, between and similar to the main nerves, often branched, reticulations obscure petiole 1 to 3 in long, stout, bordered by the decurrent margins of the blade *Cymes* axillary, trichotomous, corymbosely subumbellate, puberulous, reaching 75 in long, peduncles angular, about 2 in long, pedicels slender, 1 in long bracts linear-subulate, acute, bracteole on the pedicel, rounded buds

clavate 3 in long, the tip ovate, flowers yellowish-white, fragrant *Calyx* deeply 5 cleft, lobes linear, acute, 06 in long, pubescent, ciliate on the margins *Corolla* tube narrowly cylindric, slightly dilated near the top opposite the stamens, contracted at the throat which is naked but furnished with an annular fold within, glabrous without, puberulous below the stamens within, lobes oblong, broad, 125 in long, recurved *Stamens* inserted below the throat of the tube, anthers lanceolate, 05 in long filaments as long, slender *Disk* of 5 minute very villous scales surrounding the ovary and almost adherent *Ovary* of 2 distinct carpels, ovoid glabrous style 15 to 2 in long, very slender, stigma oblong, apiculus bifid *Fruit* of 1 or 2 pedicellate drupes the pedicels 3 to 5 in long drupes 5 in long, 3 in broad, ellipsoid, shortly apiculate pericarp thin striate *Seed* solitary, 3 to 5 in long, 2 to 3 in broad ellipsoid deeply cleft on one side where it is attached to the placenta testa membranous albumen horny, deeply ruminate, and presenting closely packed horizontal lamellæ, cotyledons flat, oblong 075 to 1 in long radicle cylindric, stout, 15 in long Hook f Fl Br Ind III 635 *A Cynopogon* Syst Veg IV 440, Will Cat 1605 1 *gumata* Miq Fl Ind Bat II 407, *sida* Stapf in Trans Linn Soc Ser 2 IV 207

KIDAH at Gunung Riva *Curtis* 2547 PLNANG *Curtis* 2881, 3088 PERAK *Ridley* 7177 (antley) DINDINGS Pangkor, at Rajah Itam, *Curtis* 1622 MACACCA cultivated *Mangay* (K D) 1054 SINGAPORE Wallich 1605 Merton 12 *Ridley* 1801 4427, 8905 — DISTRIB Sumatra Borneo (*Hamland* 2176, flowers rather longer than type)

3 *AIYXIA ODORATA* Will Cat 1606 (1829) A climbing shrub with smooth very dark brown bark young branches thinner than a goose quill 4 angled shining dark red brown when dry *Leaves* coriaceous, opposite or in whorls of 3 to 4 oblanceolate or oblong oblanceolate obtuse or subacute at apex, narrowed at the base both surfaces glabrous pale brown when dry the upper shining the lower rather dull margins recurved, 2 to 5 in long, 1 to 15 in broad mid rib stout impressed above raised and sharp beneath, main nerves extremely numerous, perhaps 25 to 40 in number, but difficult to distinguish from the equally numerous secondary nerves which are branched and often recurrent, usually at an angle of 80 with the mid rib and straight to join an intramarginal nerve close to the edge, raised but faint on the upper surface, almost invisible on the lower petiole 2 to 3 in long, bordered by the decurrent margin of the blade *Cymes* axillary, about 5 in long, including the short angled peduncle, few flowered, pedicels 06 in long, angular, pubescent bracts lanceolate,

buds clavate, '3 to '4 in. long, tip ovate. *Calyx* campanulate, '1 in. long; lobes 5, linear-lanceolate, pubescent. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the throat which is annulate within, glabrous outside, pubescent within, '4 in. long; lobes ovate, broadly obtuse, recurved, '125 in. long. *Anthers* narrowly ovate; filaments short, slender. *Disk* none or so appressed to the ovary as to be indistinguishable, white-villous. *Ovary* of 2 rounded carpels; style very slender, '3 in. long, stigma capitate. *Fruit* of 2 or 1 ellipsoid, long- (up to '4 in.) pedicelled drupes, often 2-seeded by superposition; each drupe '4 to '5 in. long, '3 in. broad, pericarp ribbed, furrowed on one side opposite the placenta. *Seed* conform to the drupe; testa membranous, separated, albumen deeply ruminate in horizontal lamellæ.

MALACCA. Griffith. SINGAPORE: at Sungei Morai, Ridley 4427, 5659.—DISTRIB. Burma (Tonasserim, Wallich 1606).

Ridley's specimens show smaller leaves than those of the type, of which there is only one specimen, viz. in the Wallichian Herbarium at the Linnean Society, but the shape and nervation agree, as does the bark of the twigs. The Wallichian specimen and Griffith's being in fruit only, the description of the flowers is taken from Ridley's.

4. *ALYXIA OLEIFOLIA*, King & Gamble, n. sp. A small climbing or epiphytic shrub, branchlets rather thick, boldly angled, with smooth pale brown bark, minutely rugose and puberulous, nodes swollen and ridged. *Leaves* thickly coriaceous, opposite or in whorls of three, elliptic or elliptic-lanceolate sometimes almost rhomboid, acute at apex or slightly blunt-acuminate, narrowed at base, upper surface shining, dark olivaceous, lower surface dull yellowish-olivaceous, both surfaces glabrous, lower sometimes puncticulate, margins much recurved when dry, 1.5 to 2.5 in. long, .75 to 1.25 in. broad, midrib very stout and broad, much impressed above and raised beneath, main nerves 10 to 12 pairs, at right angles to the midrib, often forked, depressed above, invisible beneath, secondary nerves many, very obscure; reticulations invisible; petiole stout, .15 to .25 in. long, wrinkled, bordered by the decurrent margins of the blade. *Cymes* subterminal and axillary, reaching about 1 in. in length, glabrous, few-flowered; peduncles .3 to .5 in. long, angular, as are the branches, pedicels short, bracteoles linear-subulate, similar to the calyx-lobes, buds clavate, '4 to '5 in. long, tip ovate. *Calyx* campanulate, deeply 5-lobed, lobes linear-subulate, '1 in. long, ciliate. *Corolla*-tube cylindric, slightly dilated opposite the stamens, contracted at the mouth which is annulate within, glabrous except slight pubescence below the stamens within, lobes ovate, obtuse, erect or slightly recurved, .15 in. long. *Anthers*



ovate lanceolate, 05 in long, filaments slender *Disk* of 5 densely villous scales surrounding the ovary *Ovary* of 2 rounded carpels, puberulous style slender, stigma globose with a bifid apiculus, ovules 1 in each cell *Fruit* of 1 or 2 very shortly pedicellate ellipsoid drupes, each drupe about 5 in long and 35 in broad, pericarp crustaceous, striate, slightly furrowed on one side opposite the placenta, transversely ridged within *Seed* 1, grooved on one side where it is attached to the placenta, 4 in long, 25 in broad, testa membranous, albumen horny, deeply ruminant in horizontal lamellæ, cotyledons ovate, 1 in long, radicle cylindric, thick, 15 in long

PERAK in the mountains, at 4,500 to 5,500 feet, *Wray* 230, 3846, 4116 *Scortechini King's Collector* 7405, *Cantley*, at Gunong Buhu, 5040 feet

5 *ALYXIA PUMILA*, Hook f Fl Br Ind III 635 (1882) A small climbing shrub, branchlets as thick as a crow quill, angled, reddish brown minutely rugose innovations with deciduous pubescence *Leaves* coriaceous, opposite or in whorls of 3, narrowly elliptic or ovate or lanceolate elliptic, acute or shortly subacuminate at apex, cuneate at base or slightly rounded, both surfaces glabrous except when very young, upper shining dark olivaceous, lower dull and pale almost yellowish, margins recurved, 75 to 2 in long, 35 to 75 in broad midrib rather slender impressed above, raised beneath, main nerves 15 to 20 pairs, at first 75 to 80 with the midrib, very faint on the upper surface, invisible on the lower, secondary nerves few, faint, reticulations invisible petiole 1 to 15 in long, stout, bordered by the decurrent margins of the blade *Cymes* short, axillary, 5 or 6 flowered, on 25 in long peduncles *Calyx* deeply 5 lobed, lobes linear, white, 05 in long *Corolla* tube cylindric below, dilated near the top opposite the stamens, then constricted above, 2 in long, glabrous without, pubescent within below the stamens, lobes ovate, 05 in long, glabrous, spreading, throat not annulate *Anthers* lanceolate, acute, rounded at base, 04 in long *Disk* 5 lobed, white-villous *Ovary* 2 carpelled, style slender, stigma oblong *Fruit* of 2, usually 1, short-pedicelled ellipsoid drupes, each about 4 in long, 3 in broad, pericarp crustaceous, shining, grooved on one side *Seed* conform to the drupe, grooved on one side at the attachment to the placenta, testa thin, separated albumen horny, ruminant in flat lamellæ

KEDAH at Gunong Jera, *Ridley* 5504 PERAK top of Batu Kusan, *Scortechini* 1621 MALACCA *Mangay* (K D) 1053, on Mount Ophir, *Ridley* 10094, *Lobb*

6 *ALYXIA FORBESII*, King & Gamble, n sp A climbing shrub, branchlets as thick as a crow-quill, 3-angled, pale brown, shining,

glabrous, the nodes slightly swollen, ridged. *Leaves* chartaceous, opposite or in whorls of 3 to 4, lanceolate, oblong lanceolate or elliptic lanceolate, obtusely rather long-acuminate at apex, cuneate at base both surfaces glabrous, green when dry, the lower slightly paler and dull, margins very slightly recurved, thinly cartilaginous, 2.5 to 5 in long, .75 to 1.5 in broad, midrib slender but prominent, impressed above, raised beneath, main nerves very numerous, 27 to 30 pairs, at an angle of about 80° with the midrib, slender, straight to join a slender intramarginal nerve less than .05 in from the edge, difficult to distinguish from the very numerous, often branching, secondary nerves reticulations irregular, all nerves rather faint on the upper very obscure on the lower surface, petiole .05 to 1 in long, bordered by the decurrent, usually connivent margins of the blade. *Cymes* axillary slender, lax, glabrous, 3- to 5 flowered, reaching in all about 1 in in length, peduncles .25 in long, pedicels very slender, 1 to 1.5 in bracts 0 or linear, leafy, caducous, buds clavate, .5 in long, tip ovate flowers white. *Calyx* shortly campanulate, deeply 5 lobed, lobes ovate acute spreading, 1 in long. *Corolla*-tube cylindric, 4 to 6 in long, slightly dilated near the top opposite the stamens, contracted at the throat, which is annulate within, glabrous except the upper part within lobes ovate cordate, 1.5 to 2 in long, recurved. *Anthers* lanceolate, rounded at base filaments short slender. *Disk* undulately 5 lobed, white villous, enclosing the ovary. *Ovary* of 2 rounded glabrous carpels, style very slender, stigma globose, with a bifid apiculus. *Fruit* of 1 or 2 ellipsoid drupes on very short pedicels each drupe 4 to 5 in long and 3 in broad, grooved on one side opposite the placenta, pericarp thin, almost membranous. *Seed* 1, conform to the drupe, testa membranous, albumen horny, deeply lunate cotyledons oblong, 1.5 in long, radicle stout, 1 in long, the base oblique. *A stellata*, Wall Cat 1604 Hook f Fl Br Ind III 636 (not of Roem and Sch.) *Gynopogon stellatum*, Kurz in Journ As Soc Beng XLVI ii 251, and For Fl II 176 (not of Labill.)

PENANG Wallich 1604 PERAK at Gunong Iras, 4,000 feet *Wray* 4165, on Larut Peak, 3,000 to 4,000 feet, *King's Collector* 2124, *Scortechinii* PAHANG at Kluang Terbang, *W D Barnes* 10898 —DISTRIB Sumatra (*Forbes* 2268, on Mount Dempo, at 4,000 to 5,000 feet, 2256) Java (*Forbes* 1043)

On following up the suggestion made in the Fl Br Ind that this plant is not identical with the Polynesian *A stellata*, we feel bound to agree, and consider it best to give it a new name

7 *ALYXIA SCORTECHINII*, King & Gamble, n sp. A climbing shrub, young branches thinner than a goose-quill, pale brown, shining, angled,

minutely rusty-puberulous, nodes swollen. *Leaves* thinly coriaceous, in whorls of 3 or opposite; oblong-oblancoelate, shortly cuspidate-acuminate at apex, narrowed at the base from above the middle; upper surface dark-olivaceous, glabrous, shining when dry, lower surface almost dull, paler and in young leaves minutely puberulous especially along the midrib; margins thin, slightly recurved; 4 to 6 in. long, 1.5 to 2 in. broad; midrib stout, impressed above, raised beneath; main nerves extremely numerous, probably more than 50, but difficult to distinguish from similar secondary nerves, usually at an angle of 80° with the midrib, straight to join an intramarginal nerve at a little less than .05 in. from the edge, much branched recurrently, raised on the upper surface, reticulations in a minute network; petiole .3 to .5 in. long, transversely corrugated when dry and bordered by the decurrent edges of the blade. *Cymes* sessile, axillary, densely crowded, about twice as long as the petioles, bracts numerous, linear-lanceolate, pubescent, pedicels very short, bracteolate below the calyx, buds clavate, .5 in. long, tip oblong obtuse. *Calyx* .15 in. long, campanulate, deeply cleft in 4 to 5 linear lobes, .1 in. long, pubescent outside, glabrous within. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the mouth, which is annulately folded within, pubescent within and on the upper half without, .4 in. long; lobes 4 to 5, ovate, erect or recurved, pubescent, margins incurved, .15 in. long. *Anthers* ovate-lanceolate, apiculate, .05 in. long, filaments slender. *Disk* villous, appressed to the ovary. *Ovary* of 2 conical carpels, style very slender, .3 in. long, stigma minute, capitate. *Fruit* of 2, more usually 1, ellipsoid, long-pedicelled drupes, about 1 in. long and .5 in. broad. pericarp ribbed when dry, especially opposite the placenta. *Seed* conform to the drupe, albumen ruminant, cotyledons oblong, radicle cylindric, rather long.

PERAK. *Scortechnii*, at lower camp, Gunong Batu Poteh, Wray 1091, at Kwala Kunga, Ridley 2895.

Ridley's specimen is the only one with fruit and its leaves are rather thinner than those of the other specimens, but otherwise it corresponds well enough. To this species probably also belong Burbidge's specimens in leaf only from Borneo, and Beccari's No 333 from Sumatra. all in the Kew Herbarium.

#### SPECIES IMPERFECTLY KNOWN.

8. *ALYXIA SELANGORICA*, King & Gamble, n. sp. A slender climbing shrub; branchlets the size of a crow-quill, pale brown, shining, angled. *Leaves* coriaceous, opposite or in whorls of 3 to 4; obovate or oblanceolate, shortly and abruptly acuminate at apex, long cuneate at base;

olivaceous and shining on the upper surface, dull and rather paler and minutely rusty-puberulous on the lower; margins recurved; 3 to 4 in. long, 1 to 1.25 in. broad; midrib stout, impressed above, raised beneath, main nerves very many, 25 to 30 or more, difficult to distinguish from the similar but rather fainter secondary nerves, these latter recurrent-branched, all meeting an obscure intramarginal nerve, nearly at right angles to the midrib, obscure on both surfaces but slightly raised on the upper; petiole .25 in. long, rusty-pubescent, bordered by the decurrent margins of the blade. *Flowers* not known, but fruiting cymes axillary, scarcely longer than the petiole, few-flowered. *Fruit* of 1 or 2 long-pedicelled drupes; pedicels .3 to .4 in. long, drupes oblong ellipsoid, acute at both ends, .75 in. long, .35 to .45 in. broad, pericarp black and wrinkled when dry. *Seed* conform to the drupe but rounded at the ends, grooved on one side where it is attached to the placenta, testa thin, separated; albumen horny, much ruminant in horizontal lamellæ, cotyledons oblong, .2 in. long, .075 in. broad, radicle stout, cylindric, .225 in. long.

SELANGOR. at Gua Batu, Ridley 8558.—DISTRIB. Sumatra (*Forbes* 3212).

# 6. RAUWOLFIA, Linn.

Trees or shrubs, glabrous or rarely pubescent. *Leaves* 3- to 4-nately whorled or opposite (rarely), nerves slender. *Flowers* in corymbose or umbellate cymes, usually compound, alternate with the terminal leaves or axillary to the upper leaves. *Calyx* short, 5-lobed, eglandular. *Corolla*-tube cylindric, sometimes dilated opposite the stamens, constricted at the mouth, the throat usually hairy within, lobes 5, broad, overlapping to the left. *Stamens* included in the corolla-tube above the middle, filaments short; anthers small, acute, rounded at base. *Disk* cup-shaped or annular. *Carpels* 2, distinct or connate, style filiform, stigma broad, calyptriform or peltate, ovules 2, collaterally placed, in each carpel. *Fruit* of 2 connate or distinct drupes, each with a crustaceous 1-seeded pyrene. *Seeds* ovate; testa thin, albumen thin, fleshy, cotyledons flat, radicle large, superior.—DISTRIB. About 50 species, chiefly tropical American; about 10 from India and the Malay Peninsula and islands.

Corolla-tube cylindric, inflated opposite the stamens; carpels distinct; pyrenes flattened; leaf-nerves rather distant (Subgenus I. OPHIOXYLON) .. .. 1. *R. perakensis*.  
Corolla-tube campanulate, not inflated opposite the stamens; carpels connate; pyrenes rounded and beaked; leaf-nerves many, close (Subgenus II. CYRTORIPHONIA) .. .. 2. *R. sumatrana*.

1 *RAUWOLFIA PERAKENSIS*, King & Gamble, n sp A small shrub, branchlets somewhat fleshy, pale brown, as thick as a goose-quill, sparsely lenticellate *Leaves* fleshy in texture when green, membranous when dry opposite or whorled, variable in size, glabrous, lanceolate or spatulate, rather long acuminate at apex, narrowly attenuate at base bright green above turning dark brown when dry, greyish-green beneath turning buff, 4 to 8 in long, 1 to 3 in broad, midrib broad, often sinuous when dry, main nerves 12 to 15 pairs, pale, starting from the midrib nearly at right angles and curved upwards to and along the margin secondary nerves and reticulations obscure, petiole slender, 5 to 75 in long *Cymes* corymbose, long-peduncled, 1 to 4 together from the axils of upper leaves, peduncle 15 to 35 long, branches dichotomous, ultimate ones subumbellate, pedicels slender, 1 in long, 25 in fruit, bracts minute, triangular, caducous *Calyx* lobes ovate-acuminate, 06 in long, glabrous *Corolla*-tube slender, 3 to 5 in long tubular, inflated towards the top, glabrous on both sides, lobes ovate, blunt, about 1 in long *Disk* annular, 04 in long *Stamens* short blunt anthers as long as the filaments *Ovary* rounded, style filiform 15 to 2 in long, stigma cylindric calyptriform *Drupes* crimson connate only at the base, obliquely ovate, 5 in long, 25 in broad flattened exocarp fleshy *Pyrenes* crustaceous, prominently rugose, albumen thin cotyledons ovate, radicle as long as cotyledons, together 25 to 3 in long

PERAK *Scortechini* 920 1161, 8410 *Wray* 3692 *Ridley* 2898, 5523 PAHANG *Ridley* 1166

This species is very near *R. densiflora*, Benth., of Ceylon & India, and the Khasia Hills but differs in the much shorter calyx lobes, the narrower corolla tube, and the flattened drupes. From *R. serpentina*, Benth., it differs in the veins of the leaves starting nearly at right angles instead of obliquely, and in the larger, usually more separated and flatter drupes and more pitted pyrenes.

2 *RAUWOLFIA SUMATRANA* Jack Mal Misc 22 (1820) A small tree reaching 40 to 50 feet in height and 6 to 10 in in diameter, with erect stout branches and milky juice, branchlets more or less quadrangular, lenticellate *Leaves* pergumaceous, opposite or verticillate, generally in threes, sometimes in fours, elliptic oblong to obovate spatulate, shortly acute or acuminate at apex, long attenuate at base, margins entire, slightly reflexed, both surfaces glabrous, the lower pale, 6 to 8 in long, 2 to 3 in broad, midrib slender, very prominent, impressed above, much raised beneath, main nerves parallel, 32 to 35 pairs, nearly at right angles (80°) to the midrib, then straight, joining in a looped intra-marginal nerve near the edge, secondary nerves similar but fainter, usually one only between each pair of main nerves, reticulations very

few, petiole 75 to 1 in long, slightly winged by the decurrent margins of the blade *Flowers* in terminal compound umbels, primary peduncles 3 to 5, stout, 3 to 4 in long, secondary peduncles 6 to 8, 1 to 15 in long, tertiary peduncles 3 to 5, about 5 in long, quaternary peduncles and pedicels slender, 1 to 25 in long, umbellules of about 4 to 6 flowers, bracts subulate, recurved, bracteoles very minute, buds subglobose, flowers white *Calyx*-lobes imbricate, nearly orbicular, 05 in long on a tube of same length *Corolla* tube campanulate, 2 in long, lobes rounded, recurved, 05 to 1 in long, tube tufted pubescent within at the mouth and a little below it, lobes short, rounded, 075 in long *Anthers* sagittate mucronate, 04 in long filaments very short *Disk* thick, short, barely 025 in long, obscurely 5 lobed *Ovary* 2-celled, furrowed, style slender, 1 in long stigma peltate, cells 2-ovuled *Drupe* oblong-globose, smooth, 6 to 7 in long, 5 to 6 in broad, pyrenes two, compressed at top, enlarged below, beaked, longitudinally furrowed and rugose, woody *Seed* flattened, testa membranous, albumen thin, embryo flattened, cotyledons ovate, 1 in long radicle thick, as long as cotyledons *Hook Bot Misc* II 73 *Blume Bijdr* 1034, *A DC Prodr* VIII 337, *Hassk Fl Bot Zeit* (1845) 263 *Spanoghe in Linnæa* XV 325, *Koord & Val Bijdr* I 93 *Cyrtosiphoniu sumatranu*, *Miq Fl Ind Bat* II 401

*PLANK* *Scortechini* 132, 1737, *King's Collector* 4755, 5700 — *DISTRIB* *Sumatra* (*Teysmann* 993, 995, *Forbes* 2851, 2860), *Java* (*Forbes* 1051)

*Jack* says that the wood is very light and is used by the Sumatrans for the scabbards of swords and krises

## 7 HUNTERIA, Roxb

Glabrous trees *Leaves* opposite, coriaceous, shining with many slender nerves *Flowers* in short close axillary or subterminal cymes *Calyx* small, 5 lobed, eglandular *Corolla* salver-shaped the tube cylindric, somewhat dilated near the mouth, throat annulate, lobes much overlapping to the left *Stamens* inserted in the dilated portion of the tube, anthers oblong-lanceolate, cells rounded at the base filaments short *Disk* none *Carpels* 2, distinct, style filiform, thickened at top, stigma bifid, ovules 2 to 4 in each carpel *Fruit* of two stalked berries, distinct or connate at base, ovoid or subtriangular, oblique or recurved, 1 seeded or 2 celled by the intruded placenta, not pulpy *Seeds* ovoid or oblong, testa membranous, albumen smooth, fleshy, cotyledons ovate, leafy, radicle straight — *DISTRIB* Three species—one of India, Ceylon, and Malay Peninsula, another of Java and a third of tropical Africa

**HUNTERIA CORYMBOSA**, Roxb Fl Ind I 695, and ed Carey and Wall II 531 (1824) A tree, reaching 30 to 40 feet in height and 15 to 20 in in diameter, branchlets slender, slightly angled and striate, and dull brown when dry *Leaves* oblong or oblong lanceolate, obtusely abruptly caudate-acuminate at apex, acute at base, glabrous on both surfaces, 3 to 7 in long, 1 to 2 in broad, midrib slender, impressed above, prominent beneath, main nerves numerous, about 22 to 26 pairs, slender, slightly curved upwards to meet in an intramarginal nerve close to the edge, secondary nerves similar to main-nerves, recurrent-branched, reticulations prominent, all more or less raised on both surfaces when dry, petiole 25 to 5 in long, slender *Cymes* on short peduncles about 5 to 75 in long branches corymbose, short, pedicels slender, angled, 1 to 2 in long, bracts minute, flower buds slender, 5 to 6 in long, flowers waxy white *Calyx* lobes ovate acute, 05 to 1 in long glabrous *Corolla* tube cylindrical, 3 to 35 in long, slightly dilated above and annulate at the throat, minutely pubescent within, lobes ovate oblong 2 to 25 in long *Stamens* with short filaments, anthers 05 in long *Carpels* conical, glabrous *Berries* globose, obtusely beaked smooth, yellow, 2 seeded, 75 in in diameter, on a 25 in long flattened stalk *Seeds* ovoid, flattened on one side, convex on the other 5 in long, 4 in broad testa very thin, albumen thick fleshy cotyledons ovate 145 in long, 3 nerved radicle stout, cylindric as long as the cotyledons Wall Cat 1608, Wight Ic t 428, A DC Prodr VIII 350 Miq Fl Ind Bat II 409 Hook f Fl Br Ind III 637 Trimen Fl Ceyl III 128 *H. zeylanica* Gardn, Thw Enum 191, Bedd Fl Sylv t 265 *H. lanceolata*, Wall Cat 161, A DC l c *H. Rooburghiana* Wight Ic t 1294 Thw Enum 192, Bedd l c CLVIII *Camararia zeylanica*, Retz Obs IV 24 A DC l c 389 *Gynopogon lanceolatum*, Kunz For Fl II 177 *Taberna montana salicifolia*, Wall Cat 1580 *H. parviflora*, Herb Heyne

KEDAH on Lankawi Island, Curtis 237 PENANG Wallich 1608, King's Collector 1460, 1468 Phillips PERAK Wray 3378, King's Collector 7465 SELANGOR Ridley 855b—DISTRIBUTION India, Ceylon, Burma, Sumatra (Forbes 2716, 2722, 2737)

## Subtribe 2—CERBERINÆ

### 8 CERBERA, LINN

Small glabrous trees or large shrubs *Leaves* alternate or scattered, long, with slender parallel nerves *Flowers* large, white or red, in pseudo-terminal cymes *Calyx* 5 lobed, eglandular, the segments long, tube almost none *Corolla* large tube funnel shaped above,

cylindric below; lobes 5, spreading, overlapping to the left. *Stamens* included, small; anthers lanceolate, apiculate, rounded at base. *Disk* none. *Carpels* 2, distinct; style filiform; stigma large, disciform, with a bilobed apiculus; ovules 4 in each carpel, on both sides of a thick placenta. *Fruit* of 1, rarely 2, globose or ellipsoid drupes, pericarp very thick, fibrous and woody. *Seeds* broad, compressed, peltately attached to the enlarged placenta, albumen none, cotyledons thin; radicle very short — **DISTRIB.** Species 4, found in Madagascar, tropical Asia and the Pacific Islands.

**CERBERA ODOLLAM**, Gaertn. Fruct. II. 193, t. 124 (1791). A small tree or large shrub, with very thick branches and stout branchlets prominently marked by the scars of fallen leaves. *Leaves* leathery, variable in shape and somewhat in venation, oblanceolate or oblong-obovate, acute or abruptly short acuminate at apex, attenuate at base, black when dry, glabrous on both surfaces, shining above, 3 to 8 in. long, 1 to 2 in. broad, midrib slender, main nerves numerous but variable in number (15 to 25), starting nearly at right angles to the midrib, straight and meeting in an intramarginal looped nerve; secondary nerves many, between the main nerves, reticulations indistinct, petiole .75 to 1.5 in. long, stout. *Cymes* large, main peduncles stout, 3 to 5 in. long; branches corymbosely paniculate, bracts ovate, deciduous, leafy, .5 to 1 in. long, pedicels .75 to 1 in. long, stout, flowers white with a red or yellow throat. *Calyx* glabrous, lobes linear-oblong, acuminate, .5 to 1 in. long. *Corolla-tube* .5 to .75 in. long, cylindric below, funnel-shaped above, pubescent and ribbed within and furnished with 5 projecting ribs at the mouth, lobes broadly elliptic, oblique, acute, about as long as the tube. *Drupe* ovoid, 2 to 4 in. long, smooth, green, 2 to 4 in. in diameter; pericarp very thick, fleshy without, fibrous within. *Seeds* broad, compressed, cotyledons fleshy, ovoid, flattened. A. DC. Prodr. VIII. 353, Wight Ic. t. 441, Roxb. Fl. Ind. I. 692, and ed. Carey & Wall. II. 527; Miq. Fl. Ind. Bat. II. 413, Brandis For. Fl. 322, Kurz For. Fl. II. 171, Bedd. Fl. Sylv. CLVII.; Hook. f. Fl. Br. Ind. III. 628, Trimen Fl. Ceyl. III. 128, Cooke Fl. Bomb. II. 128, Prain Beng. Plants 670, Koord. & Val. Bijdr. I. 84. *C. Manghas*, Linn. Sp. Pl. 208, partly; Wall. Cat. 1582 and Roxb. Fl. Ind. ed. Carey & Wall. II. 529, Hook. Bot. Mag. t. 1845, K. Schum. in Engl. & Prantl Nat. Pflanzenfam. IV. 2, 159, fig. 57, P to S. *C. lactaria*, Ham., A. DC. l. c.; Miq. l. c. 414. *C. laurifolia*, Lodd. Bot. Cab. t. 989. *Tanghinia Odollam*, *lactaria*, and *laurifolia*, G. Don Gen. Syst. IV. 98. "*Odollam*," Rheede Hort. Mal. I. t. 39.

**PENANG:** Wallich 1582; Curtis 1651, 1713. **PERAK:** *Scortechini* 964, Wray 2508; Ridley 7178, King's Collector 1131. **MALACCA:** Griffith; Hervey. **SINGAPORE:** Ridley 8083, Hullett 807, 871. —



**DISTRIB** India, Ceylon, Burma, Malay Archipelago, China, Australia, Pacific Islands

A plant of sea coasts and tidal creeks Hullett says the Malay name is "*Betak-betak*," and that the milky juice is poisonous Linnæus's name, *C. Manghas*, ought to take precedence of Gaertner's, but it was applied to two species, the former of which belonged to a different genus, so we follow the Fl Br. Ind. and other authorities in retaining Gaertner's name

## 9 OCHROSIA, JUSS

**Trees** *Leaves* whorled, rarely opposite or scattered, nerves very numerous parallel, spreading *Cymes* pedunculate at the ends of the branches, alternate with the uppermost leaves, finally lateral *Calyx* 5-lobed, eglandular *Corolla* salver-shaped, tube cylindric, not or very slightly dilated opposite the stamens, throat naked, lobes 5, twisted, overlapping to the right *Stamens* included in the tube of the corolla at or above the middle, anthers lanceolate, rounded at the base. *Disk* very small, annulate, or none *Carpels* 2, distinct or connate at the base style filiform stigma oblong, 2-fid ovules in each carpel 2 to 6, biseriate, on either side of a prominent placenta *Fruit* of 2 spreading drupes, sometimes connate at the base, epicarp thinly fleshy, endocarp thick, hard, often dorsally compressed and more or less grooved ventrally *Seeds* solitary or 2 separated by the placenta, flattened, testa membranous, albumen absent or fleshy cotyledons large, flat, foliaceous, radicle short, superior—**DISTRIB** About 12 species, found from the Mascarene Islands eastwards through the Malay Archipelago to Australia and the Pacific

**OCHROSIA BORBONICA**, Gmel Syst Veg I 439 (1796) A small overgreen glabrous tree, reaching 20 feet in height, branches very stout, fleshy, branchlets fleshy, glaucous green, marked with the prominent scars of fallen leaves *Leaves* fleshy when green, membranous when dry, in whorls of 3 to 4 or irregularly placed, obovate, obtuse and very briefly apiculate at apex, cuneately narrowed at base, upper surface shining, lower pale, 4 to 10 in long, 2 to 5 in broad, midrib stout, raised on both sides, main nerves many, 20 to 26 pairs, slender, parallel, leaving the midrib at an angle of about 80° and slightly curving to meet in an intramarginal nerve close to the edge, secondary nerves 1 to 2 between each pair of main nerves branching and joining the irregular reticulations, petiole 5 to 15 in long, thick *Cymes* in short, thick, corymbose branches, primary peduncles stout, 1 to 4 in long, secondary peduncles about 1 in long, branches and pedicels short, thick, lower bracts somewhat leafy, upper deciduous, bracteoles 2, triangular, on the pedicels below the calyx, flowers white, buds elongate *Calyx*-lobes

coriaceous, ovate, tube about equal to lobes, *Corolla*-tube cylindric, about 15 in long, glabrous within, lobes spreading, oblong, as long as tube or rather longer *Drupes* 2 to 2.5 in long, 1.75 in broad, slightly recurved, yellow, obliquely ovoid *Seeds* large, flat A DC Prodr VIII 356, Wall Cat 1584, Bedd Fl Sylv CLVIII, Hook f Fl Br Ind III 638, Trimen Fl Ceyl III 129, t 60 *O. salubris*, Blume Mus Bot I 158, Kurz For Fl II 172 *Cerbera salutaris*, Lour Fl Cochinch I 163, Blume Bijdr 1033 *C. parviflora* Wall Cat 1584 *C. oppositifolia* Lam Enc I 62, A DC l c 354 *C. platysperma*, Gaertn Fruct II 193 *Lactaria salubris*, Rumph Herb Amb II 255, t 84, Miq Fl Ind Bat II 415 *Calpicarpum Lamarckii*, G Don Gen Syst IV 100

SINGAPORE Wallich 1584 —DISTRIB Andaman Islands, Ceylon, Mascarene Islands, Malay Archipelago

A plant of the tidal creeks ' more decidedly maritime than *Cerbera Odollam* (Trimen) The milky juice is thick and viscid The leaves as shown in Trimen's plate are not at all characteristic

#### 10 KOPSIA Blume

Glabrous trees or shrubs *Leaves* opposite, membranous or sub coriaceous, penniveined *Flowers* white or pink, in short terminal cymes, the rachis often bearing imbricated bracts *Calyx* small, 5 partite, eglandular within *Corolla* salver shaped tube very slender, only slightly dilated opposite the stamens, without scales at the mouth pilose within, lobes twisted, overlapping to the right *Stamens* near the top of the tube, anthers acute, cells rounded at the base *Disk* of 2 glands alternating with the carpels *Carpels* 2 distinct, style filiform, stigma thickened, with a short apiculus, ovules 2 in each carpel, 1 on either side of a thick placenta *Fruit* of 2 obovoid or obliquely quadrate drupes or capsules, furrowed on the anterior face, pericarp subcoriaceous, 1 seeded, or 2 celled by the intruded placenta and two seeded *Seeds* oblong, testa membranous, albumen none, cotyledons usually thick —DISTRIB About 12 species of the Malay Peninsula and Archipelago

Tube of corolla dilated at the top —

Branches of the inflorescence with rather distant bracts —

Leaves usually more than 5 in long and 2 in broad —

Cymes much branched many flowered, lobes of corolla

broad

1 *K. fruticosa* var *albiflora*

Cymes little branched, few flowered, lobes of corolla

narrow

2 *K. pauciflora*

Leaves usually under 5 in long and 2 in broad

- Carpels glabrous; corolla-tube under 1 in. long; calyx-lobes acuminate .. .. 8. *K. Scortechinii*.
- Carpels hairy, corolla-tube over 1 in. long; calyx-lobes rounded .. .. 4. *K. Griffithii*.
- Branches of the inflorescence covered with many closely imbricating bracts; bracts very small; cyme-branches very short; corolla-tube under 4 in. long .. .. 5. *K. larutensis*.
- Tube of corolla dilated in the middle; branches of the inflorescence with imbricating bracts:—
- Cymes under 5 in. long; leaves lanceolate, under 4.5 in. long .. .. 6. *K. Ridleyana*.
- Cymes 1 to 3 in. long; leaves elliptic-oblong or oblong-ovate, 5 to 9 in. long .. .. 7. *K. macrophylla*.

1. *KOPSIA FRUTICOSA*, A. DC. Prodr. VIII. 352 (1844). A large evergreen shrub, branchlets smooth, pale brown. *Leaves* thinly coriaceous, opposite, elliptic, elliptic-oblong, or elliptic-lanceolate, obtusely caudate-acuminate at apex, acuminate attenuate at base; glabrous on both surfaces, shining above, pale beneath, 4 to 9 in. long, 1.5 to 3.5 in. broad, midrib thick, main nerves prominent beneath, 10 to 14 pairs, more or less parallel, gradually curving upwards to meet in a faintly looped intramarginal nerve close to the edge; secondary nerves short; reticulation distinct; petiole short, .25 in. long, ending in a gland at the apex. *Cymes* short, in a dense many-bracted subtrichotomous corymb at the ends of pseudo-terminal peduncles, peduncle short, stout, secondary peduncles also short, as are the tertiary and the pedicels, all minutely fulvous-pubescent, as are the bracts; bracts many, ovate, acute or obtuse, .1 to .15 in. long, pubescent, ciliate on the edges, leaving when they fall prominent scars; bracteoles similar, 2 on each pedicel under the calyx. *Calyx*-tube short, lobes 5, minutely pubescent, ovate-oblong, obtuse or emarginate and with a gland at the apex, ciliate on the margins, .15 to .2 in. long. *Corolla*-tube slender, slightly dilated at the summit opposite the stamens, 1.5 in. long, mouth red, minutely pubescent; lobes elliptic obovate, obtuse, half as long as the tube or slightly more, pink. *Anthers* oblong-lanceolate, acute. *Disk*-glands beaked. *Carpels* 2, oblong, obtuse; style slender, stigma calyptriform, 2-lobed at top. *Fruit* of 2 (more usually 1) urn-shaped flattened capsules, more or less triangular in shape, 1 to 1.25 in. long, villous, veined, opening by a slit on the ventral margin. *Seeds* oblong-lanceolate, .8 in. long, .25 in. broad, 3-ribbed; testa membranous; albumen none, cotyledons oblong-lanceolate, .75 in. long, .25 in. broad, fleshy, radicle very small. Bot. Mag. 4220; Hook. f. Fl. Br. Ind. III. 639, Prain Beng. Plants, 671. *Calpicarpum Roxburghii*, G. Don Gen. Syst. IV. 100, Wight Ic. t. 431, Kurz For. Fl. II. 178, Miq. Fl. Ind. Bat. II. 412. *Cerbera fruticosa*,

Ker Bot. Reg. t. 391; Roxb. Fl. Ind. I. 691, and ed. Carey & Wall. II. 526; Wall. Cat. 1583.

SINGAPORE: cultivated, *Maingay* (K.D.) 1055.—DISTRIB. Burma. This shrub is very commonly cultivated in Indian and Malayan gardens.

VAR. *albiflora*, King & Gamble. Differs but little from the species, but has white flowers, a glabrous acutely pointed capsule, more oblong leaves, and rather larger corolla-lobes. *Calpicarpum albiflorum*, Teysm. & Binn. in Tijds. Ned. Ind. XXV. (1863) 402. See also Ridley in Trans. Linn. Soc. Ser. 2, III. 320.

SINGAPORE: *Goodenough* 59, *King's Collector* 1232, *Ridley*.—DISTRIB. Java, Ceram (*Teymann* 5035).

2. *KOPSIA PAUCIFLORA*, Hook. f. Fl. Br. Ind. III. 639 (1882) A shrub (?); branchlets slender, pale brown, uppermost angled. *Leaves* chartaceous, elliptic or elliptic-lanceolate, obtusely caudate-acuminate at apex, acuminate at base, olivaceous-green and somewhat shining on the upper, yellowish and dull on the lower, surface, 4 to 6 in. long, 1.5 to 2.5 in. broad, midrib fairly prominent, impressed on the upper, much raised on the lower, surface; main nerves 6 to 10 pairs, distant, starting at an angle of 60° with the midrib and curving upwards to join in an obscure intramarginal nerve quite close to the edge, secondary nerves and transverse reticulations prominent on the lower surface, petiole .25 in. long, stout. *Cymes* terminal, few-flowered, the rachis .25 to .5 in. long, with many ovate-acute persistent bracts. *Calyx* .15 in. long, lobes ovate, obtuse, rather shorter than the tube. *Corolla*-tube very slender, cylindric, 1.5 to 2 in. long, villous inside, dilated at the top, lobes linear-oblong, 1 in. long, at length reflexed in flower. *Anthers* small, near the top of the tube. *Fruit* not known.

MALACCA: on Mount Ophir, *Maingay* (K.D.) 1056.

3. *KOPSIA SCORTECHINI*, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height; the branchlets swollen at the nodes. *Leaves* chartaceous, elliptic oblong, briefly acuminate at apex, unequally narrowed at base, somewhat shining on the upper, pale on the lower surface; margins slightly recurved; 2 to 5 in. long, 1 to 2 in. broad; midrib slender, impressed above, ending in a gland at the apex, main nerves 8 to 16 pairs, at an angle of about 70° with the midrib, curving upwards to join in an intramarginal nerve immediately close to the edge; reticulations inconspicuous; petiole .1 in. long, glandular at the base inside. *Cymes* terminal, pseudo-terminal or lateral, on peduncles of varying (.25 to 2 in.) length; branches spreading, corymbose; bracts ovate-triangular, acute, .1 to .15 in. long, glabrous, pedicels short variable, each with a pair of small bracteoles; flowers large, white; buds clavate. *Calyx*-tube scarcely any, lobes ovate

acuminate, with a gland at the point behind, ciliate on the margins, .1 in. long. *Corolla*-tube slender, dilated at the top then constricted, .75 to 1 in. long, pubescent within below the stamens and half-way down, lobes spreading, linear-oblong, .5 to .75 in. long. *Anthers* lanceolate-acuminate, .1 in. long; filaments short. *Disk*-scales longer than carpels, broadened below, beaked above. *Carpels* glabrous, style very slender, stigma short, cylindric. *Fruit* not seen

PERAK · *Scortechini* 1878.

4. *KOPSIA GRIFFITHII*, King & Gamble, n. sp. A small tree (?); branchlets pale brown, slender, enlarged at the nodes. *Leaves* coriaceous, ovate to ovate-oblong, abruptly obtusely caudate-acuminate at the apex, which is often emarginate, attenuate at the base, shining above, pale beneath, 3.5 to 5 in. long, 1.5 to 2 in. broad, midrib slender, prominent and channelled above, main nerves many (22 to 30 pairs), close, parallel, starting at an angle of about 70° with the midrib, and slightly curving to meet in an intramarginal nerve close to the edge, raised and prominent on the upper, less so in the lower surface, reticulations few, petiole .25 in. long, bordered by the decurrent margins of the blade, those of each pair of leaves embracing the branchlet so as nearly to meet. *Cymes* axillary and pseudo-terminal, sessile or on very short peduncles, corymbose, primary branches few and irregular in length and number of flowers (sometimes 1 flower only), bracts ovate-acute, very small, glabrous; pedicels slender, 4 to 6 in. long, with 2 to 3 minute bracteoles near the middle, flowers apparently large, white, buds long, clavate. *Calyx*-tube almost none, lobes nearly orbicular, .05 in. long, ciliate on the margins, a gland on the back near the top. *Corolla*-tube very slender, 1 to 1.5 in. long, inflated at the top, slightly pubescent within below the stamens, lobes ovate, ovate-oblong or oblong, obtuse, .75 to 1 in. long. *Anthers* lanceolate-acuminate, .15 in. long, filaments short. *Disk*-glands subulate, slender. *Carpels* obtuse, densely long-hairy, style slender, stigma oblong, bifid. *Fruit* not seen.

MALACCA · *Griffith*

*VAR. paucinervis*, King & Gamble. A shrub, 4 to 6 feet high, flower very white. Similar to the species, but the leaves with fewer, 12 to 15 main nerves leaving the midrib at an angle of about 50° only, and not so abruptly or caudately acuminate. The carpels show the same shaggy hairs, and the disk-glands are the same.

PERAK *King's Collector* 10707, in dense jungle, on limestone hills, at 500 to 800 feet.

5. *KOPSIA LARUTENSIS*, King & Gamble, n. sp. A shrub reaching 10 feet in height, or a small tree up to 25 feet, branches pale brown,

rather smaller than a goose-quill, corky-barked and somewhat scurfy when dry. *Leaves* coriaceous, oblong-lanceolate, obtusely long caudate-acuminate at apex, cuneate at base, margins recurved, upper surface shining, lower pale, both reddish when dry, 4 to 10 in long, 1.5 to 2.5 in broad, midrib stout, ending in a gland at the extreme apex, main nerves parallel, 15 to 22 pairs, impressed on the upper, raised on the lower surface, starting at an angle of about  $70^\circ$  to the midrib and gently curving upwards to meet in a looped intra-marginal nerve close to the edge, secondary nerves and reticulations few, petiole very short or almost none, at most 2 in long, stout, those of each pair of leaves joined by a slight ridge at the nodes. *Cymes* axillary or pseudo-terminal, sessile, few- (up to 10-) branched, very short at first but lengthening gradually to 5 in, the branches covered with very small ovate-triangular densely imbricate bracts, flowers small, cream-coloured, buds clavate. *Calyx* tube short, lobes ovate, obtuse, with a gland on the back near the top, ciliate on the margins. *Corolla* tube cylindrical, slender, 3 to 4 in long, slightly dilated at the top opposite the stamens, pubescent within, lobes spreading, much twisted, 3 in long, oblong spatulate. *Anthers* lanceolate, apiculate, the bases rounded, filaments very short. *Disk* glands subulate. *Carpels* 2, glabrous. *Fruit* of 2 (often only 1) urn shaped capsules, triangular in shape, inflated on the dorsal, grooved on the ventral margin where they dehisce, 7 in long on the ventral margin, 6 in broad, 2.5 in thick, striate, beak sharp. *Seeds* 1, ovoid, 4 in long, testa membranous, albumen none, cotyledons fleshy, thick, radicle very small.

PLERAK in low lying woods near Larut, Wray 2736, 3956, *Scortechinii* 57, 59, 1704, *King's Collector* 462, 2082, 4269, 6165

6 KOPSIA RIDLEYANA, King & Gamble, n. sp. A low shrub, reaching a foot or so in height, branchlets smooth, the size of a crow quill. *Leaves* chartaceous when dry, lanceolate, obtusely acuminate at apex, cuneately attenuate at base, shining above, pale below, 4 to 4.5 in long, 1 to 1.5 in broad, midrib slender, ending in a gland at the apex, main nerves 12 to 14 pairs at an angle of about  $60^\circ$  with the midrib, curving upwards to meet in a slender looped intramarginal nerve, raised above as are the few secondary nerves and oblique reticulations, petiole 1.5 in long, somewhat stem clasping and slightly fimbriate scaly at the base. *Cyme* terminal or apparently so, sessile, branches very few (2 to 3), about 3 to 5 in long furnished with many ovate-acute broadly sheathing glabrous bracts, flowers on very short pedicels, pure white, buds clavate. *Calyx*-tube very short, lobes ovate, obtuse or almost emarginate, with a gland on the back, glabrous, 1 to 1.5 in long.

*Corolla* very slender, 1 in. long, dilated in the middle, pubescent at the mouth, glabrous within; lobes spreading, oblong-obovate, .75 in. long, .25 in. broad. *Anthers* lanceolate, acute, rounded at base, .1 in. long; filaments very short. *Disk-glands* subulate. *Carpels* 2, 2-celled, each cell 2-seeded; style very slender; stigma cylindrical, bilobed. *Fruit* not known.

NEGI SEMBILAN: at Perhutan Tinggi, Ridley 10093.

7. *KOPSIA MACROPHYLLA*, Hook. f. Fl. Br. Ind. III. 639 (1882). A shrub, 6 to 10 feet high; branchlets dark brown, the size of a goose-quill, smooth. *Leaves* thinly coriaceous when fresh, chartaceous when dry; elliptic-oblong or oblong-obovate, obtusely short caudate-acuminate at apex, cuneate at base, margins only slightly or not recurved; upper surface light green with yellow towards the centre when fresh and with a metallic lustre when dry, lower surface pale brown, very minutely pubescent especially on the nerves; 5 to 9 in. long, 2 to 2.5 in. broad, midrib stout, ending in a gland at the apex; main nerves 18 to 22 pairs, raised on both surfaces, sometimes branched, at first straight and parallel, starting at an angle of about 55° with the midrib, then slightly curving to join in an intramarginal nerve close to the edge, secondary nerves few and reticulations prominent above when dry, petiole none or at most .1 in. long, those of each pair of leaves joined by a slight ridge at the node. *Cymes* pseudo-terminal, with a short (.5 to .7 in.) stout peduncle and few, usually 2, thick branches, 1 to 3 in. long, densely covered with small broadly ovate pubescent imbricate ciliate bracts, .1 to .15 in. long; the branches not again branched, pedicels very short, stout, bracteoles 2, obtuse, ciliate, pubescent, under the calyx, flowers very white; buds clavate. *Calyx*-tube very short, lobes 5, imbricate, oblong, obtuse or emarginate, with a gland on the back, minutely pubescent and ciliate, 1 in. long. *Corolla*-tube very slender, 1 in. long, dilated in the middle, glabrous within except for a slight ring below the anthers, lobes obovate, .5 to .75 in. long, .4 to .5 in. broad, rounded. *Anthers* lanceolate, .1 in. long; filaments very short, slightly pilose at base. *Carpels* rounded, minutely pubescent at apex; style slender. *Fruit* not seen, said to be pale green in colour.

PERAK: in rich soil on low ground, King's Collector 4963. SINGAPORE: Lobb.

Haviland's No. 3042 from Borneo comes very near this, but the tube of the corolla is dilated near the top; the bracteate branches of the inflorescence are longer; and the leaves have a dark upper surface, more irregular main nerves and the marginal nerve farther from the edge, and with another more slender outside it. But the material is insufficient for description.

Subtribe 3.—EUPLUMERINÆ.

11. ALSTONIA, Br

Trees or erect shrubs; branches often in whorls. *Leaves* usually whorled, rarely opposite, frequently with numerous nearly horizontal nerves; stipules sometimes represented by glands or a ridge between the leaf-petioles. *Inflorescences* of terminal or pseudo-terminal corymbose or umbelliform cymes, sometimes verticillate on the rachises. *Calyx*-tube short, sometimes urceolate, sometimes almost none, lobes 5, short, eglandular. *Corolla* hypocrateriform; tube cylindric, dilated opposite the stamens, usually at the top, the throat naked, annulate or with reflexed hairs; lobes overlapping either to the right or left. *Stamens* usually at the top of the tube, sometimes lower, included, anthers free, usually lanceolate; filaments short, filiform. *Disk* none, or annular or lobed, the lobes 2 alternate with the carpels. *Carpels* 2, distinct; style filiform, stigma oblong or cylindric, usually bifid at apex, ovules in each cell many, pluriseriate. *Fruit* of 2 follicular mericarps, usually long, cylindric, slender. *Seeds* oblong, compressed, peltate on flattened tough placentas, ciliate and usually with tufts of long hairs at the ends; testa membranous, often papillose, albumen fleshy, rather scanty, cotyledons oblong, flat, radicle about as long as the cotyledons, superior.—*DISTRIB.* Species about 30, found in India, Malaya, tropical Australia and Polynesia, one in tropical Africa

*Leaves* with close parallel nerves, apex usually obtuse; corolla-lobes overlapping to the left; follicles over 6 in. long, equally broad throughout; seeds rounded at both ends (Subgenus I. *PALA*):—

Ovary villous; corolla-tube pubescent without; leaves 3 to 7 in. long .. .. . 1. *A. scholaris*.

Ovary glabrous; corolla-tube glabrous without:—

Corolla-tube rather broad, follicles glabrous; leaves 2 to 4 in. long .. .. . 2. *A. spathulata*.

Corolla-tube slender, follicles pubescent, leaves 2.5 to 5 in. long .. .. . 3. *A. angustiloba*.

*Leaves* with close parallel nerves, apex usually acute; corolla-lobes overlapping to the left; follicles under 6 in. long, broadest in the middle; seeds oblong, dentate at the ends (Subgenus II. *BLABENOPTIS*) .. .. . 4. *A. Curtisi*.

*Leaves* with distant more or less parallel nerves; corolla-lobes overlapping to the right; follicles long, slender, equally broad throughout, seeds acute or acuminate at one end, rounded at the other (Subgenus III. *DIASURASPERMUM*):—

*Stamens* inserted at the top of the corolla-tube, which is



glabrous without, leaves 5 to 12 in long, main nerves 20 to 24 pairs; seeds rounded at one end, bifid and acute at the other .. .. 5 *A. macrophylla*.  
 Stamens inserted near the middle of the corolla tube, which is pubescent without, leaves usually 4 to 6 in long, main nerves 12 to 16 pairs, seeds rounded at one end, long acuminate at the other .. .. 6. *A. angustifolia*.

## IMPERFECTLY KNOWN

7 *A. GRANDIFOLIA*8 *A. PANGKORENSIS*

1 *ALSTONIA SCHOLARIS*, Br in Mem Wern Soc Edinb I 76 (1811) A large evergreen tree, reaching 60 feet or more in height and 6 feet or more in girth, stem buttressed branches verticillate, branchlets smooth, swollen at the nodes, juice milky, bitter as is also the wood, glabrous except the inflorescence *Leaves* coriaceous, verticillate, 4 to 7 in a whorl, oblong obovate, oblong or elliptic oblong, obtuse or sometimes shortly and bluntly acute, occasionally emarginate at apex, cuneate at base, bright green and shining above, white or grey glaucous beneath, 3 to 7 in long, 1.5 to 2.5 in broad, midrib thick, main nerves parallel, 30 to 40 pairs, at first almost at right angles to the midrib, slightly curving upwards to an intramarginal nerve close to the edge, secondary nerves many, similar but more slender, reticulations few, petiole stout, 25 to 75 in long, with a hooked process on the upper side near the base *Inflorescence* pseudo terminal *Cymes* umbellately branched, main peduncles stout, 3 to 5, variable in length, usually 2 to 3 in, secondary peduncles slender, 5 to 7, supported often by a spatulate leafy bract pedicels short, terminal flowers subsessile bracteoles oblong or ovate flowers greenish white buds obovoid whole inflorescence more or less tawny pubescent *Calyx* tube very short, lobes ovate, obtuse, ciliate, sometimes unequal in size *Corolla* tube cylindric, slightly enlarged below, much dilated at the top, hairy on both sides, 25 to 35 in long, annulate within at the mouth, lobes ovate, obtuse, 15 in long, cordate at base, rounded at top *Disk* none *Anthers* lanceolate, acute, rounded below, pollen grains spherical, with small prominences *Ovary* densely pale-villous, style slender, stigma cylindric, bifid at apex *Fruit* of 2 folioles, 1 to 2 feet long and 10 to 15 in broad, pendulous, terete *Seeds* oblong, peltate, on a narrow placenta, flattened, 3 in long, 0.75 in broad, scabrous-papillose on both surfaces, reddish-brown, furnished at each end with tufts of slender tawny hairs up to 5 in long, albumen very thin, cotyledons oblong, about 1 in long, radicle slender, as long as cotyledons A DC Prodr VIII 408, Wall Cat 1644, Wight Ic t 422, Hook f Fl

Br. Ind. III. 642, Miq. Fl. Ind. Bat. II. 436; Blume Bijdr. 1037, Brandis For. Fl. 325, Bedd. Fl. Sylv. t. 242; Kurz For. Fl. II 183; Koord. & Val. Bijdr. I. 117; Trimen Fl. Ceyl. III. 133, Engl. & Prantl IV. i. 138, t. 53; Cooke Fl. Bomb. II. 132; Prain Beng. Plants, 672. *Echites scholaris*, Linn Mant. 55. *E. Pala*, Ham. ex Spreng. Syst. I. 633; A. DC. l. c. 477. — "*Pala*," Rheede Hort. Mal. I. t. 45.

PENANG: *Wallich* 1644A. PERAK: *Wray* 170 (Vern "*Poko Palai*"), *Scortechini* 601, *King's Collector* 7952. MALACCA. *Hervey*. SINGAPORE: *Wallich* 1644B. — **DISTRIB.** Throughout India, Ceylon and Burma, the Malay Archipelago, tropical Australia and Africa

2. *ALSTONIA SPATHULATA*, Blume Bijdr. 1037 (1834). A tree reaching 30 to 40 feet in height and 12 to 15 in. diam, (*Scortechini* and others), 60 to 100 feet in height and 3 to 4 feet in diameter (*King's Collector* 5263); glabrous, branches verticillate, branchlets smooth, swollen at the nodes. *Leaves* coriaceous; verticillate, 3 to 5 in a whorl, obovate or spathulate; rounded at the apex, or sometimes slightly obcordate, cuneate at base, bright green and shining above, whitish beneath, when dry both surfaces brown, margins recurved, 2 to 4 in. long, 1 to 2 in. broad, midrib stout, impressed above, main nerves raised above, 20 to 30 pairs, the lower ones horizontal, the upper gradually more and more curving upwards to meet in an intramarginal nerve close to the edge, secondary nerves few, similar, reticulations indistinct, petiole very short, bordered by the decurrent margin of the blade. *Inflorescence* pseudo-terminal. *Cymes* small, umbellately arranged in whorls, peduncle 1 to 2 in. long, stout, usually 1 only, sometimes 2 to 3, whorls of flowers 2 to 3, about .5 in. or less apart, pedicels slender, .25 to .5 in. long, bracts and bracteoles small, ovate-acute, caducous, flowers a "frosty" or "waxy" white, buds clavate. *Calyx*-tube .05 in. long, lobes as long, orbicular, margins ciliate. *Corolla*-tube slender below, dilated above, .25 in long, pubescent within, annulate at the throat; lobes oblong, twisted, .2 in. long, white villous within at the base. *Ants* lanceolate, small, filaments very short, pollen-grains spherical with opposite round prominences. *Disk* none or very short. *Ovary* glabrous; carpels separate below, joined above, style slender, .15 in. long; stigma cylindric, bifid. *Fruit* of two follicles, 5 to 7, occasionally to 9, in. long, .1 to .15 in. broad, erect, terete, sometimes minutely pubescent. *Seeds* oblong, peltate, flattened, .25 in. long, .1 in. broad, ciliate and margined all round, nearly smooth on the faces, furnished at each end with tufts of slender tawny hairs up to .75 in. long; albumen scanty, cotyledons oblong, about .1 in. long; radicle as long as cotyledons, slender A. DC. Prodr.

VIII. 410, Miq. Fl. Ind. Bat. II. 437; Hook. f. Fl. Br. Ind. III. 642; Koord. & Val. Bijdr. I. 121. *A. cuneata*, Wall. Cat. 1645

PERAK: in low marshy places and on river banks, *Scortechini* 1716; *Wray* 170 bis; *King's Collector* 400, 4009, 6852, 7464, 7780 MALACCA: *Griffith*; *Maingay* (K.D.) 1068; *Derry* 1064; *Cantley* 1937.—DISTRIB. Java, Borneo (*Haviland*, 1689, 3044).

Wallich's No. 1645 bears on the label, "e Sirmur," which is clearly a wrong habitat as mentioned by Hooker.

3. *ALSTONIA ANGUSTILOBA*, Miq. Fl. Ind. Bat. II. 438 (1856). A large tree reaching 60 to 100 feet in height and 3 to 4 feet in diameter; branches spreading, verticillate, branchlets dark brown, as thick as a goose-quill, terete. *Leaves* coriaceous, verticillate, 4 to 7 in a whorl, oblong or elliptic-oblong, shortly and obtusely acute at apex, attenuate at base, shining light green above, glaucous grey beneath, margins recurved, 2.5 to 5 in long, 1 to 1.5 in. broad, midrib prominent, main nerves very many, 30 to 40, the lower ones parallel, at right angles to the midrib, the upper curved upwards, all meeting in the slightly thickened nerve-like margin, raised above, secondary nerves few, similar; reticulations very indistinct, petiole .5 to .75 in. long, channelled above, bordered by the decurrent margins of the blade. *Inflorescence* terminal, grey-pubescent, umbellate, peduncles stout, 1 to 5 together (usually 1 only), followed by a whorl of about 4 to 6 secondary branches, .25 to .5 in long, bearing capitate clusters of many flowers on very short pedicels, and in addition 3 to 5 longer branches surmounted by similar capitate clusters or again whorled, bracts and bracteoles very small, ovate-acute, caducous, flowers dark red without, pale yellow within (K.C. No. 5270); buds narrow, linear, clavate, glabrous. *Calyx*-tube short, lobes ovate-acute, grey-pubescent, ciliate, together .06 in long. *Corolla*-tube cylindrical, slightly dilated above, annulate at the mouth, glabrous without, pubescent within, .25 in. long, lobes narrow, linear-oblong, .15 to 2 in. long, with a small tuft of villous hairs at the base within. *Disk* none. *Antthers* lanceolate-acute, pollen-grains spherical, with 2 small spherical prominences opposite each other on different sides. *Ovary* glabrous, carpels distinct; style slender; stigma cylindrical, bifid at apex. *Fruit* of two grey-pubescent follicles, 6 to 8 in long and barely .1 in in diameter, erect, terete. *Seeds* flat, rectangular-oblong, .2 in. long, .05 in broad, bordered, not papillose, furnished at each end with a tuft of long tawny hairs up to .5 in long, albumen scanty, cotyledons oblong, narrow; radicle as long as cotyledons. Koord. & Val. Bijdr. I. 120.

PENANG: *Curtis* 3087. PERAK: *Wray* 4058; *King's Collector* 5263,

5270 MALACCA Griffith SINGAPORE Cantley 166, Ridley 8095 (var *glabra*, Koord & Val) —DISTRIB Java (Koorders 1β, 14230), Borneo (Haviland 1732) Wray gives the vernacular name "*Jelutong*," Curtis "*Getah Paule*," Cantley "*Gutta Puler*"

A leaf specimen collected by G King "halfway up Penang hill," in August, 1879, and another from Malacca, collected by Hervey in 1885, have "*Leaves* in whorls of 4 to 6, oblong lanceolate, shortly and bluntly acuminate at apex, attenuate at base, green above, glaucous grey beneath, 4 to 6 in long, 1 to 1.5 in broad, main nerves very many, nearly 40, very regular and parallel, petiole rather slender, 2.5 to 6 in long" They agree well with Teysmann's No 994 from Loeboe Aloeng, Sumatra, *Alstonia calophylla*, Nig Fl Ind Bat II 489

4 ALSTONIA CURTISII, King & Gamble, n sp A dwarf compact shrub, branchlets slender, grey, ringed by the ridges marking fallen leaves *Leaves* membranous when dry, in whorls of 3 to 4, oblong lanceolate, sharply acuminate at apex, attenuate at base, dull on both surfaces, pale beneath, margins recurved, 3 to 4 in long, .75 to 1 in broad, midrib slender, main nerves parallel, starting at about 70° to the midrib and curved upwards to the margin, 24 to 27 pairs, indistinct, secondary nerves similar, between the main nerves, reticulations very indistinct, petiole none or very short, bordered by the decurrent margins of the blade, with 2 to 3 small subulate glands on the upper surface at the base *Cymes* pseudo-terminal, 1 to 2, few flowered peduncles short, 1 to 2 in long, pedicels slender, .75 in long, flowers white, buds long clavate with a swelling in the middle *Calyx* tube short, lobes as long as tube, .05 in, ovate acuminate, hyaline at the margins glabrous *Corolla* tube very slender, 1 in long, dilated a little above the middle, glabrous without, slightly pubescent within below the stamens, lobes oblong falcate, overlapping to the left in bud, 6 in long, spreading, glabrous *Stamens* inserted within the dilatation, anthers lanceolate, 15 in long, filaments short, pollen globose *Disk* of two subulate scales on broad bases alternate with the carpels *Ovary* glabrous, style very slender, stigma cylindric, elongated (.05 in), bifid at apex, ovules very many *Fruit* of two glabrous follicles, 3 to 3.5 in long, 1 to 1.5 in broad, acuminate at apex *Seeds* oblong, peltate on a tough placenta, .25 in long, 1 in broad, margins scabrous, dentate, especially at the ends, testa covered with brown papillæ on the outer and with two ridges on the inner side, coma white, silky, very short at the sides, up to .15 in long at the ends albumen scanty

KASOOM limestone islands, Curtis 3242

5 ALSTONIA MACROPHYLLA, Wall Cat 1648 (1829) A large tree, reaching 40 to 60 feet in height and 1 to 2 feet in diameter, branches stout, fleshy, branchlets more or less quadrangular and channelled on

the sides, marked with prominent leaf-scars *Leaves* chartaceous, ternately verticillate, oblong-lanceolate or elliptic-lanceolate, shortly and abruptly acuminate at apex, cuneately attenuate at base for nearly half their length, light green above, pale and glabrous or sparsely brown-pubescent, especially along the nerves beneath, margins slightly recurved, 5 to 12 in long, 1.5 to 3 in broad, midrib slender, main nerves 20 to 24 pairs, parallel, starting at about 65° with the midrib and curving upward to meet in a very faint looped intramarginal nerve close to the edge, raised beneath, secondary nerves none, reticulations transverse, indistinct, petiole stout, 5 to 1 in long, when young slender, base enlarged *Inflorescence* pseudo-terminal, sessile, peduncles about 6 to 10, slender, 1 to 2 in long, simple or occasionally branched, bearing spreading, many-flowered, 2- to 3-chotomous cymes, bracts none, bracteoles minute, ovate acute, pedicels slender, cyme branches pedicels and calyx minutely grey, pubescent flowers yellowish-white, buds cylindric clavate *Calyx* tube short, 0.3 in long, lobes 5, ovate acute, pubescent without, glabrous within except at the tips. *Corolla* tube cylindrical below, slightly dilated above, glabrous without, sparsely pubescent within below the stamens, mouth contracted, 1.5 in long lobes oblong, rounded folded in bud and overlapping to the right, as long as the tube ciliate on the edges and villous at the base within *Stamens* inserted at the top of the corolla-tube, anthers lanceolate, apiculate, rounded below filaments short, pollen spherical *Disk* annular, 0.25 in deep *Ovary* glabrous, ovoid, acute, carpels 2, ovules very many style slender, stigma cylindric, bifid *Fruit* of two pendulous follicles reaching 18 in in length, about 1 to 2 in in thickness, terete *Seeds* peltate, on narrow, ribbon like placenta, oblong, rounded below, slightly bifid and acute above, bordered by tawny hairs which are short at the sides and long plumose, up to 3 in at the ends, testa very thin, papillose, albumen rather thick, cotyledons oblong, small, radicle as long as cotyledons A DC Prodr VIII 409 Hook f Fl Br Ind III 643, Miq Fl Ind Bat II 438 1 *costata*, Wall Cat 1649, not of Br

PENANG Wallich 1648, 1649 *Manrayay* (K I) 1066/2, 1070/2, Curtis 378, King's Collector 1637, 1732, 1733 — *DISTRIB* Borneo, Philippines, New Guinea

6 *ALSTONIA ANGUSTIFOLIA* Wall Cat 1650 (1829) A tall tree, branchlets dark brown, somewhat quadrangular and channelled, stout *Leaves* nearly coriaceous, ternately whorled or opposite obovate or oblanceolate, obtusely abruptly acuminate at apex, long cuneately attenuate at base for about half their length, glabrous and green above, pale and glabrous or when young pubescent beneath, margins slightly

recurved, 4 to 6 in. long, 1 to 1.75 in. broad; midrib slender, channelled above; main nerves 12 to 16 pairs, at an angle of from 60° to 70° to the midrib, curving upwards to meet in a very faint intramarginal looped nerve, secondary nerves few; reticulations many, transverse; petiole .5 to 1 in. long. *Inflorescence* pseudo-terminal, sessile, grey-pubescent, peduncles 2 to 6, variable in length, usually from 1 to 2 in. long, ending in branched 2- to 3-chotomous corymbose spreading cymes, bracts none; bracteoles minute, triangular; pedicels slender, short but variable; flowers small, grey-pubescent, white (?), buds shortly clavate. *Calyx*-tube urceolate, glabrous within, .05 to .1 in. long, lobes ovate, reflexed, pubescent on both surfaces, .005 in. long. *Corolla*-tube cylindric, slightly dilated a little above the middle, pubescent on both surfaces, .125 in. long; lobes spreading, .075 in. long, rounded, nearly glabrous within when open, except for the tuft of hairs above the base. *Stamens* inserted a little above the middle of the tube, anthers ovate, apiculate, .035 in. long, filaments very short. *Disk* annulate, wavy at margin, very short. *Ovary* glabrous, ovoid-acute, style slender; stigma conical, penicillate below, bifid above. *Fruit* of two erect (?) follicles, reaching 18 in. in length and .15 in. in diameter, stiff, ribbed when dry. *Seeds* peltate, on narrow, ribbon-like, tough placentas, oblong, rounded below, long acuminate above, .4 in. long, .1 in. broad, bordered by tawny hairs which are short and reflexed at the sides and plumose at the ends, reaching .3 in. in length, testa thin, minutely papillose on the inner, villous on the outer surface, albumen flattened; cotyledons oblong, as long as the straight radicle. A. DC. Prodr. VIII. 409, Hook. f. Fl. Br. Ind. III. 643.

PENANG: *Griffith*; *Mangay* (K.D.), 1066, 1067, 1070. MALACCA: *Derry* 1080. JOHORE: *Ridley* 10942. SINGAPORE: *Wallich* 1650; *Kurz*; *T. Anderson* 140, *Ridley* 2716, 5571.

VAR. *elliptica*, King & Gamble. *Leaves* opposite or in whorls of three, elliptic, acute at apex and at base, glabrous except on the lower surface when quite young, 3 to 4 in. long, 1.25 to 1.75 in. broad, main nerves regular, raised beneath, petiole .75 to 1 in. long with a callus on the inner surface near the base, branchlets rough, dark brown.

PENANG: *Curtis*. Scarcely a variety, but the shape of the leaves is very distinct.

VAR. *latifolia*, King & Gamble. *Leaves* larger, obovate, 5 to 7 in. long, 2.5 to 3 in. broad, glabrous. *Flowers* rather larger; calyx-lobes shallower. A small tree with spreading branches, reaching 15 to 20 feet in height and 3 to 4 in. in diameter.

PENANG: *Mangay* (K.D.) 1070/1, 1070/2; *Curtis* 2491; *Fox* 80; *Ridley* 9306; *Stoliczka*; *King's Collector* 1341.

This species comes very near to *A. villosa*, Blume, of the Malay Archipelago, but we hesitate to join them, as there are important characters of difference, e.g., the very villous inside of the corolla tube in *A. villosa*

## SPECIES IMPERFECTLY KNOWN

7 *ALSTONIA GRANDIFOLIA*, Miq Fl Ind Bat Suppl 555 (1862) A lofty tree, the branchlets very stout, sharply angled, transversely rugose. Leaves chartaceous, in whorls of 4 to 6, those of each whorl usually more or less unequal, elliptic-oblong or obovate, acute at apex, gradually narrowed from the middle downwards at the base, brown and glabrous and somewhat shining on the upper, glaucous on the lower, surface, margin undulate, 7 to 13.5 in long, 2.5 to 5 in broad, midrib very stout, flat on the upper, much raised on the lower, surface, main nerves 20 to 30 pairs, very regular, parallel, at an angle of from 60° to 70° with the midrib, straight to the margin to meet a nerve which forms the margin itself, all raised beneath, secondary nerves very few, chiefly near the apex. Reticulations transverse, forming an elegant network on the lower surface. Petiole 1 to 1.25 in long, stout. Follicles elongate, woody (Miq) Rest unknown

SINGAPORE *T. Anderson* 119 —DISTRIB Sumatra (*Teysmann*)

*A. ezima*, Miq, l.c., seems to differ only in the main nerves being more nearly at right angles (80°) with the midrib. It also comes from Sumatra

8 *ALSTONIA LANGKORENSIS*, King & Gamble, n. sp. A large tree (?), branches very stout, smooth, somewhat fleshy, grey. Leaves membranous, obovate or oblanceolate, abruptly and shortly and bluntly acuminate at apex, cuneate at the base for the lower two thirds, glabrous above, minutely pubescent beneath, especially on the nerves, margins recurved, 12 to 14 in long, 4 in broad, midrib very stout, impressed above, strongly raised beneath, main nerves about 18 pairs, stout, parallel, raised beneath, usually about 7.5 in apart along the midrib, starting at an angle of about 75° and gently curving upwards to the margin, secondary nerves few, reticulations bold, fairly prominent on the lower surface, petiole stout, about 7.5 in long. Follicles very slender, 10 to 12 in long, glabrous, striate, the margins reflexed after the fall of the seeds. Rest unknown

DINDINGS Pangkor Island, *Scortechini* 1024

12 *DYFRA*, Hook f

Glabrous trees with verticillate branches and thick angular channelled branchlets, laticiferous. Leaves in whorls, large, coriaceous, oblong or obovate, with prominent main nerves and long petioles,

stipular ridges between the petioles. *Inflorescence* of pseudo-terminal and axillary umbellately branched cymes, flowers small. *Calyx* 5-lobed, very small, eglandular, tube very short, adnate to the base of the ovary. *Corolla* hypocateriform, 5-lobed; tube short, hardly dilated opposite the stamens; the throat naked, lobes 5, folded in bud and overlapping to the left. *Stamens* 5, in the middle of the tube, included, filaments very short, anthers oblong-ovoid, cells small; the connective produced in a thickened terminal fleshy appendage. *Disk* annular, obscure. *Ovary* 2-celled, short, entire, conic, obtuse at the top, which is pubescent, style none or minute; stigma obpyriform, minutely bifid at apex; ovules many in each cell on intruded placentæ. *Fruit* of two cylindric follicular mericarps of very large size, connate at the base, at first divergent, afterwards curling back and opening flat. *Seeds* elliptic, large, flat, peltate, surrounded by a broad membranous striate wing, longer at the ends than in the middle, testa very thin, glandular-papillose, albumen flat, rather scanty, cotyledons elliptic, very thin, radicle small, superior.—*DISTRIB.* Three species, of the Malay Peninsula and Archipelago.

Leaves usually under 6 in long, main nerves starting nearly at right angles to midrib; corolla-tube nearly as long as lobes, cymes with rather short peduncles .. .. 1. *D. costulata*.  
 Leaves under 8 in long, main nerves starting at about 60° with the midrib. corolla-tube very much shorter than lobes; cymes with long peduncles .. .. 2. *D. laxiflora*

1. *DYERA COSTULATA*, Hook. f. in Journ. Linn. Soc. XIX. 293 (1882). A very large tree, reaching 100 to 150 feet in height and 3 to 4 feet in diam., branches verticillate with reddish thick bark, branchlets thick, angular and channelled, at any rate when dry. *Leaves* coriaceous, in whorls of 6 to 8; broadly elliptic or elliptic-oblong, rounded and sometimes very shortly and abruptly acute at apex, rounded at base or sometimes attenuate, upper surface bright green shining, lower pale bluish-green glaucous, especially when young; margins somewhat undulate, slightly recurved, 3 to 7 in long, 1·5 to 3 in. broad; midrib stout, very prominent beneath, impressed and keeled above; main nerves 16 to 20 pairs, at first nearly at right angles to the midrib, then curving upwards to join in a looped nerve at the margin, raised on both surfaces when dry, as are the prominent reticulations; petiole 1 to 1·25 in. long, ribbed, furnished with a rounded cone-like gland on the upper surface at the base, the glands of the uppermost whorl of leaves conniving in a cone over the bud. *Cymes* pseudo-terminal, or from the penultimate leaf-whorl; peduncles of varying length, 1 to 3 in. long, rather slender, branches umbellately whorled; secondary peduncles ·25 to ·5 in. long,



pedicels slender, short, bracteoles triangular, minute, flowers yellowish, buds linear oblong *Calyx*-tube adnate to the base of the ovary, lobes ovate rounded, glabrous, 6 in long *Corolla*-tube short, 1 in long, glabrous, except a ring of scanty reflexed hairs within near the base below the insertion of the filament, narrow raised folds between the stamens, lobes oblong, cordate at base, folded in bud, rounded at top, 15 in long *Stamens* inserted a little above the base of the corolla tube, pollen globose with small pits *Follicles* very large, on greatly thickened peduncles (5 in in diam), 9 to 15 in long, 1 to 15 in broad, after splitting open nearly 3 in broad, connate at the base, at first straight, but after dehiscence curved backwards so as nearly to touch at the points *Seeds* peltate, flat, elliptic, surrounded by a membranous striate wing, broader at the ends than in the middle, 25 in long, 1 in broad, the seed part 125 by 75 in, testa thin, granular papillose, albumen thin, cotyledons ovate, 7 by 4 in, very thin and difficult to separate, radicle short Fl Br Ind III 644 *Alstonia costulata*, Miq Fl Ind Bat Suppl 556

PENANG Curtis 339I, Scortechini 1973, King's Collector 4689, 4811, 8784 MALACCA Griffith, Mangay (K D) 1097 Derry 554 PAHANG in Tahan Woods, Ridley in Trans Linn Soc 2nd Ser III 320 SINGAPORE Ridley 4922 — DISTRIB Sumatra (Teysmann, Dupenhorst 1114)

This is the chief plant that gives the 'Gutta Jelutong', which seems however to be used only as an adulterant of the true Guttas given by species of *Palasium* and *Paysona* Bercari, in 'Nelle foresti di Borneo' 561, says that the Gutta of the allied Bornean species *Dyera Loui*, Hook f, is absolutely wanting in elasticity, and quickly resinifies and becomes pulverulent

2 *DYERA LAXILORA*, Hook f Fl Br Ind III 644 (1882) A very large tree, reaching 100 to 150 feet in height and 3 to 4 feet in diam, branches verticillate, branchlets angular, furrowed, rugose, very thick, dark brown *Leaves* chartaceous, in whorls of 4 to 7 elliptic-obovate or obovate, rounded or shortly acute at apex, rounded at base or especially when young cuneate attenuate, upper surface bright green glossy, lower glaucous, margins slightly recurved, 6 to 8 in long, 2 to 3.5 in broad, midrib prominent, depressed and keeled above, much raised beneath, main nerves 13 to 17 pairs, starting at an angle of about 60° with the midrib, and only very slightly curving upwards to meet in a looped nerve at the margin, slightly impressed above, raised beneath, reticulations many prominent on both surfaces, petiole 1 to 2 in long, channelled, furnished at the base with a prominent gland, which, especially those of the uppermost whorl, is recurved, hooked

and forms a cone over the bud. *Cymes* from the penultimate whorl of the branchlets, peduncles 2 to 5 in long, slender branches umbellately whorled, secondary peduncles slender, 75 to 1 in long, pedicels very slender, about 2 to 3 in long, bracts leafy, orbicular, petioled, caducous, bracteoles very small, triangular flowers white, buds linear-oblong. *Calyx*-tube adnate to the lower part of the ovary, lobes orbicular, rounded or sometimes emarginate, glabrous, 05 in long. *Corolla* salver-shaped, tube urceolate, ribbed without, 075 in long, glabrous, except a ring of reflexed hairs below the insertion of the filaments, lobes oblong, rather narrow in bud, broad in flower, reaching 2 in in length and 1 in in breadth. *Ovary* pubescent on top stigma sessile, bilobed. *Fruit* not known.

PERAK *Wray* 541, *King's Collector* 7852 (or 4?) SINGAPORE  
*Murton*, *Burbridge*, *Cantley* 226, *Ridley*, *Hullett* 343 Vern name,  
 ' *Kayu* (wood) *Jelutong* (*Wray*)

### 13 HOLARRHENA, B.

Trees or shrubs. *Leaves* opposite usually membranous, glabrous or pubescent, pinnerved. *Flowers* white, in terminal or axillary or sub axillary corymbose cymes. *Calyx* 5 fid or 5 partite lobes narrow, usually glandular at the base on one or both sides. *Corolla* hypocrateriform, tube slender, cylindric, slightly dilated opposite the stamens, the throat contracted, naked, lobes 5, oblong, overlapping to the right. *Stamens* included in the tube near the base. anthers lanceolate mucronate, cells rounded at the base, filaments short, slender. *Disk* none. *Ovary* of 2 distinct carpels, style shortly filiform, stigma below the anthers oblong fusiform, tip entire or bifid, ovules many in each carpel. *Fruit* of 2 elongate, terete, follicular mericarps. *Seeds* oblong or linear, concave inside, the funicle in the concavity, tipped with a deciduous coma of slender hairs, albumen scanty, cotyledons broad, complicate, radicle short.—*DISTRIB* Species 8, 5 in tropical Africa, 3 in India and Malaya.

Leaves over 4 in long and 2 in broad membranous, main nerves irregular, follicles 10 to 15 in long, cymes broad 1 *H. antidysenterica*  
 Leaves under 4 in long and 2 in broad, chartaceous, main nerves regular, follicles 6 in long, cymes narrow 2 *H. Curtisi*

1 *HOLARRHENA ANTIDYSENTERICA*, Wall Cat 1672 (1828) A small tree, glabrous or pubescent, the branchlets slender, lenticellate. *Leaves* membranous, variable, ovate or ovate-oblong to elliptic, obtusely acuminate at apex, rounded or attenuate or cuneate often unequally at base, glabrous above, glabrous or more or less pubescent beneath,

4 to 8 in. long, 2 to 4 in. broad, midrib slender in the glabrous-leaved, broad in the pubescent-leaved forms, main nerves 10 to 14 pairs, irregular, at about 50° with the midrib, curved upwards to and along the margin where they anastomose, secondary nerves few or none; reticulations irregular, not prominent, petiole .1 to .2 in. long, sometimes none. *Cymes* many-flowered, dichotomous, 3 to 6 in. in diameter, sessile or shortly peduncled; pedicels slender, .25 to .5 in. long; bracts small, lanceolate, pubescent or glabrous, ciliate; buds clavate, flowers white. *Calyx*-lobes linear-lanceolate, .1 to .2 in. long, ciliate, glandular at base or not, tube scarcely any. *Corolla*-tube slender, .3 to .4 in. long, puberulous, slightly inflated at base; mouth contracted; lobes oblong, acute or rounded at top, infolded in bud, ciliate, .4 in. long. *Anthers* mucronate. *Ovary* glabrous, style short, stigma fusiform. *Follicles* 10 to 15 in. long, .2 in. broad, terete, black, often dotted with white spots, diverging below, then incurved. *Seeds* linear-oblong, channelled on the inner, rounded on the outer, face, .5 to .6 in. long, flattened at the hilum, coma golden-brown, .75 to 1 in. long, cotyledons cordate at base, .4 in. long, radicle 1 in. A. DC. Prodr. VIII. 413, Brandis For. Fl. 326, t. 40, Bedd. Fl. Sylv. CLX. tab. xx. 6, Kurz For. Fl. II. 182, Hook. f. Fl. Br. Ind. III. 644, Cooke Fl. Bomb. II. 133, Prain Beng. Pl. 674. *H. Codaga*, G. Don Gen. Syst. IV. 78, A. DC. l. c. 414, Kurz l. c. 181, Wight Ic. 1297. *H. malaccensis*, Wight Ic. 1298, Miq. Fl. Ind. Bat. II. 441. *H. pubescens*, Wall. Cat. 1673, A. DC. l. c. 413, Miq. l. c. 440. *Echites antidyenterica*, Roxb. *Chonemorpha* (?) *antidyenterica*, G. Don l. c., Wight Ic. 439. "*Codaga-Pala*," Rheede Hort. Mal. I. t. 47.

MALACCA: Capt. Wight cf. Wight Ic. 1298.—DISTRIB. India and Burma.

There are available in the Herbaria of Kew and Calcutta sheets of only one specimen, which is that collected by Capt. Wight, and which was figured in the 'Icones' as *H. malaccensis*. It is a specimen of the glabrous form of the tree, as was to be expected, that being the more usual form in the damp regions of India, as is the pubescent one in the dry regions.

2. *HOLARBHENA CURTISII*, King & Gamble, n. sp. A shrub, reaching 8 feet in height, branchlets slender, dark brown, smooth; innovations pubescent. *Leaves* chartaceous, oblong or oblong-lanceolate or obovate, acute or rounded at apex, attenuate and rounded at base; shining above, pale beneath and minutely pubescent, the margins recurved; 1.5 to 3.5 in. long, .75 to 1 in. broad; midrib thick, prominent beneath; main nerves 12 to 14 pairs, regular, at about 45° with the midrib, curving upwards to and along the margin, raised beneath, secondary

nerves occasional; reticulations minute, petiole .1 to .15 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, corymbose, pubescent, 1.5 to 2.5 in. in diameter, on peduncles .5 to .75 in. long; bracts linear-oblong or spatulate, bracteoles linear, .15 in. long, on the pedicels below the flower, pedicels slender, flowers white, buds clavate. *Calyx*-lobes linear-oblong, .25 in. long, rounded or acute at top, ciliate, pubescent, with 2 glands at the base within, tube almost none. *Corolla*-tube slender, slightly inflated near the base opposite the stamens, contracted at the mouth, .4 in. long, ciliate on the edges, pubescent on both surfaces, lobes oblong, rounded at top, narrowed at the base, the margins infolded in bud, pubescent on both sides. *Anthers* .05 in. long, mucronate. *Ovary* of 2 distinct glabrous carpels, style very short, stigma fusiform, bifid, below the anthers. *Follicles* brown, straight, terete, 6 in. long, .2 in. broad, only little divergent. *Seeds* oblong, keeled on one side, concave on the other, .4 in. long, coma golden-brown, up to 1.5 in. long.

SIAMESE STATES. Trang, at 100 to 200 feet, *Kunstler* 1402, *Curtis* 3392. — *DISTRIB* N Siam (*F. H. Smiles*), Cambodia (*Godefroy-Lebrun* 189)

#### 14 ERVATAMIA, Stapf

Shrubs or small trees, usually glabrous, branchlets usually dichotomous. *Leaves* opposite, herbaceous to coriaceous, usually membranous when dry, axillary stipules usually distinct, axillary glands small, often numerous. *Flowers* small to middle-sized, sometimes showy, in terminal, pseudo-terminal or axillary cymes, usually corymbose and often in pairs, branches dichotomous. *Calyx* small, lobes 5, free or connate at the base, glandular or not within. *Corolla* salver-shaped, tube cylindric, slightly dilated at the mouth or rarely lower, opposite the stamens, lobes overlapping to the left, rarely to the right. *Stamens* erect, included, filaments short, usually decurrent in ridges inside the tube, anthers linear, bilobed at base, acute or mucronate, dehiscing throughout their length. *Disk* 0. *Ovary* of 2 carpels, distinct or slightly cohering, style long, filiform, stigma clavate, with a slender bifid apiculus, ovules numerous, pluriseriate. *Fruit* of two follicular mericarps, obliquely ovoid to lanceolate or cylindric-lanceolate, often curved and beaked, sometimes 1- to 3-keeled; dehiscing along the ventral suture and at length often opening out flat. *Seeds* few to many, enveloped in a bright-coloured aril, more or less irregularly ellipsoid, grooved or hollowed ventrally; testa crustaceous, finely sulcate, the furrows protruded into the copious often waxy albumen; cotyledons flat, cordate, radicle cylindric — *DISTRIB*. Species about

30 to 35 in tropical Asia, Australia, and Polynesia, 1 species in Madagascar

Leaves with main nerves curving upwards; stamens near the top of the corolla tube —

Leaves chartaceous or coriaceous; branchlets stout, calyx lobes thick, broad, short —

Cymes glabrous or very slightly pubescent .. .. 1. *E. corymbosa*.

Cymes hirsute .. .. 2. *E. hirta*.

Leaves membranous; branchlets slender. —

Calyx lobes very small, under 1 in long —

Calyx lobes ovate, acute, follicles oblong, keeled, beak slightly recurved; seeds 3 to 6 .. .. 3. *E. coronaria*.

Calyx lobes ovate, rounded, follicles twisted, beak much recurved, seeds 1 to 2 .. .. 4. *E. peduncularis*.

Calyx lobes lanceolate, over 1 in long —

Calyx lobes over 3 in long, follicles 1.5 to 3 in long, narrowly cylindric, not keeled .. .. 5. *E. cylindrocarpa*.

Calyx lobes 1.5 to 2 in long, follicles .75 to 1.25 in long, oblong falcate, 3 keeled .. .. 6. *E. malaccensis*.

Calyx lobes 1 to 1.5 in long, follicles 1 to 1.5 in long, ovoid, long acuminate, not keeled .. .. 7. *E. Cumingii*.

Leaves with main nerves at right angles to midrib and straight or very slightly curving, branchlets stout, stamens near the middle of the corolla tube .. .. 8. *E. polyneura*.

1 *ERVATAMIA CORYMBOSA*, King & Gamble. A shrub or small tree, reaching 30 to 40 feet in height and 8 to 10 in in diameter, branchlets stout, smooth, uppermost internodes somewhat flattened. Leaves chartaceous, elliptic-oblong or elliptic-lanceolate, obtusely acuminate at apex, cuneately narrowed at base, dark green above, pale beneath, margins sometimes slightly recurved, those of each pair often very unequal in size, 6 to 16 in long, 2 to 6 in broad, midrib stout, raised beneath, main nerves 12 to 16 pairs, leaving the midrib at an angle of 65° to 75° and at first nearly straight, then curving upwards to and along the margin, usually impressed above and strongly raised beneath, reticulations few, inconspicuous, petiole stout, 5 to 8 in long, base enlarged half-stem-clasping, axillary glands prominent, meeting at the nodes. Cymes many-flowered, much-branched, usually in pairs in the axils of the second uppermost pair of leaves, dichotomous, peduncles variable, 5 to 25 in long, stout, secondary peduncles similar, 1 to 1.5 in long, pedicels slender, 5 to 1 in long, somewhat clavate, bracts obsolete, flowers spreading, corymbose, waxy cream-colour, buds clavate, the top large, globose, often minutely grey-pubescent. Calyx-tube campanulate, 5 in long, thick, lobes ovate, rounded, ciliate, .1 in long, glands, if present, two at the base of the lobes inside. Corolla-

tube cylindric, slender, slightly dilated at top, opposite the stamens, .75 in. long, lobes oblong-falcate, .5 in. long or rather more; pubescent without, crispate on one edge and auricled on that edge at the base. *Anthers* linear-oblong, blunt or mucronate, .125 in. long, the basal lobes adherent to the connective; filaments short, decurrent in lines inside the corolla-tube. *Ovary* of 2 ovoid, glabrous carpels; style filiform; stigma clavate, tip entire or bifid. *Follicles* thick, globular-ovoid, recurved, very shortly beaked, obtusely keeled, rough outside, 1.5 in. long, 1 in. in diameter, ventral suture impressed. *Seeds* very many, oblong-obtuse, deeply hollowed ventrally, .5 in. long, .2 to .25 in. broad and deep, testa crustaceous, glandular-papillose, with deep ridges within, which extend into the copious albumen, cotyledons cordate, 15 in. long; radicle cylindric, .25 in. long. *Tabernaemontana corymbosa*, Roxb Fl. Ind II. 25, A DC. Prodr. VIII. 376, Wall Cat. 1772 and Bot Reg. under t. 1273, Hook. f. Fl. Br Ind. III. 646, Miq. Fl. Ind. Bat II. 420.

PENANG. *Wallich* 1572, *Phillips*, *Curtis* 1763 PROVINCE WELLESLEY: *Ridley* 7032. PERAK *Wray* 4169, *King's Collector* 3141, 3522, 5792, 5999, 7163, 7376. MALACCA *Griffith*. JOHORE at Jaffarin, & *King* SINGAPORE: *T. Anderson* 82, 117, *Murton* 115; *Ridley* 4119, 8416, 8431.

VAR. *Kelsall*, *King & Gamble* Leaves thinner than in the type, oblong-lanceolate, main nerves fewer (10 pairs) and at a more oblique angle (50°). *Cymes* nearly sessile, much fewer-flowered.

SELANGOR at Bukit Etam, *Kelsall* 1992.

VAR. *pubescens*, *King & Gamble*. Inflorescence covered with slight greyish-yellow pubescence.

PERAK *King's Collector* 4830 MALACCA: *Goodenough* 1638.

(This is scarcely a variety. In many of the specimens of the species the corolla in bud is thickly tomentose outside, and thus we have a gradation from the glabrous to the pubescent form)

2 *ERVATAMIA HIRTA*, *King & Gamble* A large shrub (?), branchlets stout, somewhat flattened, dark brown, lenticellate. Leaves coriaceous, elliptic-ovate or -oblong, long acuminate at apex, acute at base, dull on both surfaces, dark olivaceous-brown on the upper, much paler on the lower, margins recurved, 4 to 12 in. long, 2.5 to 5 in. broad, midrib rather slender, flattened on the upper, raised on the lower surface, main nerves 10 to 15 pairs, starting at about 70° with the midrib and curving upwards to anastomose near the margin, impressed above, raised beneath; secondary nerves apparently none, reticulations obscure; petiole .25 to 5 in. long, stout. *Cymes* almost hirsute, many-flowered, much branched, usually in pairs in the axils of

the second uppermost pair of leaves, 2- to 3-chotomous; peduncles flattened, curved, 1.25 to 1.75 in. long; secondary peduncles similar but rather shorter; pedicels slender, about .5 in. long; bracts and bracteoles obsolete, buds clavate, reaching .75 in. long, nearly glabrous, the top globose. *Calyx* sometimes 7-lobed, cup-shaped, eglandular, hispid without, glabrous within; tube .15 in. long; lobes ovate-acute, as long as tube. *Corolla*-tube cylindric, .5 in. long, slightly inflated opposite the stamens near the top, glabrous, lobes oblong-falcate, crispate on one edge and auricled on that edge near the base, much twisted to the right, .25 in. long (in bud). *Anthers* lanceolate, with a hooked mucro at tip, .075 to .1 in. long, the basal lobes adherent to the connective; filaments short. *Ovary* of 2 ovoid glabrous carpels, style filiform; stigma clavate, with a slender, usually bifid tip. *Follicles* ovoid, falcate, recurved, obscurely keeled and obtusely beaked, 1 to 1.5 in. long by .5 to .75 in. broad, smooth outside, ventral suture impressed before dehiscence. *Seeds* many, crescent-shaped, deeply hollowed ventrally, .5 in. long, .25 in. broad and deep, testa crustaceous, ribbed, and with deep ridges which extend into the albumen, cotyledons ovate, .05 in. long, radicle slender, .1 in. long. *Tabernaemontana hirta*, Hook. f. Fl. Br. Ind. III. 646.

MALACCA: Griffith, Muirguy (K D.) 1059, Derry 77.

This species comes near to *E. corymbosa* var. *pubescens*, but the hirsute inflorescence at once distinguishes it

3. *ERVATAMIA CORONARIA*, Stapf in Dyer Fl. Trop. Afr. iv. 127 (1902). A shrub, branches many, dichotomous, corky, pale brown. *Leaves* membranous, lanceolate or oblanceolate or oblong-lanceolate, long-acuminate at apex, acuminate at base, the pairs often unequal-sized, deep green on the upper, paler on the lower surface; 3 to 6 in. long, .75 to 1.5 in. broad; midrib slender, main nerves 7 to 9 pairs, distant, curving upwards to and along the margin, secondary nerves and reticulations indistinct; petiole .3 to .4 in. long, slender, the base half-stem-clasping, axillary glands present. *Cymes* few- (2- to 10-) flowered, peduncles 1.5 in. long, pedicels slender, about .25 in. long, bracteoles minute, usually 2 to each pedicel, one below the calyx, one lower down, flowers white, fragrant, buds clavate. *Calyx*-tube short, lobes ovate, acute or rounded, ciliate, biglandular within. *Corolla*-tube slender, 7 to .9 in. long, scarcely dilated slightly below the middle opposite the stamens, pubescent within below the stamens, mouth with flattened glands, lobes as long as the tube, ovate oblong, obtuse, one edge slightly crispate. *Anthers* lanceolate, .05 in. long, minutely hooked at tip, filaments hairy. *Ovary* of 2 glabrous carpels, style short, stigma cylindric, bifid

at tip. *Follicles* spreading at about 90° to 100° apart, oblong, 1 to 2 in. long, with 1 to 3 keels and a recurved acuminate tip, opening out flat when fully ripe. *Seeds* 3 to 6, irregularly oblong, angular, .25 in. long, enclosed in a red pulpy aril; deeply grooved ventrally with a branching groove; testa crustaceous, sulcate, glandular, the furrows protruded into the albumen, which is copious, cotyledons ovate-cordate, .1 in. long, radicle cylindric, as long as the cotyledons. Cooke Fl. Bomb II, 134. *Tabernaemontana coronaria*, Willd. Enum. Hort. Berol. 275; *ibid.* Hort. Kew ed 2, II. 72; A. DC Prodr. VIII. 373, Roxb. Fl. Ind. II. 23; Wall. Cat. 1568, Wight Ic. 477, Lodd. Bot. Cab. t 406, Lindl. in Bot. Reg. t 1064, Dalz. & Gibs. Bomb. Fl. 144, Miq. Fl. Ind. Bat. II. 421, Brandis For. Fl. 322, Bedd. Fl. Sylv. CLIX., Hook. f. Fl. Br. Ind. III. 646, Trimen Fl. Ceyl. III. 133, Prain Beng. Plants 673. *T. divaricata*, Blume Bijdr. 1626, Kurz For Fl. II. 174. *Nerium divaricatum*, Linn. Sp. Pl. 306. *N. coronarium*, Jacq Coll I. 138, t 52, Bot. Mag. t. 1861 *Jasminum zeylanicum*, Burm. Fl. Ind. t. 39

KASOOM. *Curtis* 3243 PENANG: back of West Hill at 2000 feet, *Curtis* 3460. PERAK. *King's Collector* 5153 MALACCA. at Bukit Buring, *Goodenough* 1423 SINGAPORE *Wallich* 1568.—DISTRIB. Apparently wild in N. India. The shrub is commonly cultivated in gardens throughout India and Malaya

4 *ERVATAMIA PEDUNCULARIS*, King & Gamble A small shrub (small tree, *King's Collector*), branchlets slender, dichotomous, curved. *Leaves* membranous, elliptic or elliptic-oblong or oblong-lanceolate, obtusely long caudate-acuminate at apex, acute at base, glabrous, pale beneath, 4 to 9 in. long, 1.5 to 3 in. broad, midrib slender, main nerves 12 to 20 pairs, parallel, starting at an angle of about 60° with the midrib and curving upwards to join in an intramarginal looped nerve, secondary nerves none, reticulations transverse, faint, petiole .25 to .4 in. long, slender at first, afterwards thickening, the base enlarged, half-stem-clasping with a stipular scale within. *Cymes* glabrous, usually in pairs, axillary, on 2 to 5 in. long slender peduncles, branches widely divaricate, secondary peduncles .75 to 1 in. long, pedicels capillary, .2 to .3 in. long, bracteoles minute, flowers white; buds slender, clavate. *Calyx*-tube short; lobes ovate, rounded, glandular within on the middle, .025 in. long. *Corolla*-tube very slender, straight or slightly curved, .4 to .5 in. long, inflated at the top opposite the stamens; mouth naked, slightly pubescent within below the stamens. *Anthers* lanceolate, slightly mucronate. *Ovary* of 2 glabrous carpels, carpels elongate, style very slender; stigma clavate, bifid at apex just beneath the anthers. *Follicles* stipitate, twisted, oblong or rhomboid,



practically sessile, the base half-stem-clasping and forming a stipular ridge at the node, with a ligule-like gland within. *Cymes* axillary, usually to the second pair of leaves from the top of the branchlet, generally in pairs, about 6- to 10 flowered, peduncles slender, 5 to 1 in long, pedicels very slender, about 5 to 6 in long, buds slender, clavate, somewhat acute at tip. *Calyx* tube almost none, lobes linear-lanceolate, unequal, 1 to 1.5 in long, with a large round gland at the base within, usually supporting 3 smaller linear ones. *Corolla* tube slender, 6 to 7 in long, slightly inflated at top opposite the stamens, glabrous within and without, lobes narrow, oblong, undulately crispate, 5 in long. *Anthems* linear, acute or slightly mucronate, .08 in long, filaments short, decurrent in lines within the tube. *Ovary* of two rounded carpels, style very slender, stigma clavate, bifid at tip. *Follicles* horizontally divaricate, ovoid, long-acuminately beaked, not keeled or recurved, bright orange in colour, 1 to 1.5 in long about 4 in broad. *Seeds* about 6 to 8 obtusely angular, .25 to .35 in in diameter, deeply hollowed ventrally, enveloped in a crimson aril, testa brown, glandular, furrowed, the furrows deeply indented in the copious waxy albumen, cotyledons cordate, 1 in in diameter, rhizole cylindric, .15 in long.

PENANG at the Waterfall Curtis 1775. PERAK at Kuala Wok, Wray 852. *Scortechini* 63.

We have been somewhat in doubt whether Wray's and Scortechini's fruiting specimens really belong to the same plant as Curtis's excellent flowering ones but after long consideration believe we are right in considering that they do.

8. *ERVATAMIA POLYNEURA* King & Gamble. A slender glabrous shrub, reaching 20 feet in height, branchlets thick, very milky, dark brown, very prominently marked by the broad scars of fallen leaves. *Leaves* very coriaceous, elliptic or elliptic ovate or elliptic oblong, obtuse or bluntly acute at apex, somewhat rounded at base, yellowish brown when dry, upper surface green when fresh, wrinkled when dry, lower pale dotted, margins recurved, slightly so in flower, strongly in fruit. 6 to 12 in long, 2 to 3 in broad, one of each pair usually smaller than the other, midrib very stout, prominently raised on the lower, depressed and keeled on the upper, surface, main nerves 20 to 35 pairs, parallel, starting at right angles to the midrib and only very slightly curving to meet in a looped intramarginal nerve, all very indistinct, as are the reticulations, petiole stout, 4 to 8 in long, bordered by the decurrent margins of the blade, bases enlarged, furnished with axillary glands, and those of each pair joined by a stipular ridge. *Cymes* axillary, usually in pairs in the axils of the uppermost pair of leaves but one, dichotomous, 12 to 16 flowered, corymbose,

peduncles very stout, 15 to 25 in long, pedicels thick, curved, about 3 to 6 in long, in fruit the non-fruitle pedicels caducous, leaving broad prominent oblong scars, bracts small, entire, rounded, flowers scented, buds clavate, with large obtuse heads, 3 in in diameter. *Calyx*-tube short, thick, lobes ovate, obtuse, 1 to 15 in long, with many small subulate glands in a row at the base within. *Corolla*-tube cylindric, 5 in long, slightly dilated at two fifths of the way up, funnel-shaped at the mouth, glabrous on both sides, lobes overlapping to the left, folded in bud, oblong, obtuse, up to 1 in long. *Stamens* inserted at the dilatation, anthers linear, mucronate, 15 in long pollen-grains globose with small protruded round knobs. *Ovary* of two separate conical carpels, style short, stigma clavate, the apiculus bifid. *Follicles* orange, 1 to 15 in long, 5 in broad, falcate, dorsal edge straight, ventral edge much rounded, keels 3, beak long, usually hooked. *Seeds* about 4 to 6, ovoid or rhomboid, enveloped in a scarlet aril, deeply sulcate ventrally, testa crustaceous, glandular, ridged within, albumen copious. *Tubernamontana polyneura*, Scortechini MS in Herb. Cal.

PERAK at Bujoy Malacca, *Scortechini* 1867 MALACCA *Miller* 9

A very distinct plant quite different in texture and appearance to any other herein described, but coming near to *Tubernamontana dichotoma*, Roxb., of S India and Ceylon. The description is largely after Scortechini.

### Tribe III — NCHINDLÆ

#### Subtribe 1 — PARSONSIA

##### 15 PARSONSIA, B.

Twining shrubs. *Leaves* opposite. *Flowers* small, white, in terminal or axillary dichotomous cymes or thyrses. *Calyx* 5 parted eglandular or 5 scaled or minutely many glandular at the base within. *Corolla* tubular, tube short, cylindric or subglobose, naked at the throat, lobes 5, slightly twisted, overlapping to the right. *Stamens* inserted on the tube, filaments often twisted, anthers half-exsert, oblong lanceolate or linear, acute, conniving round the stigma and adhering to it, the cells produced at the base into empty rigid appendages. *Disk* of 5 lobes or scales. *Ovary* 2 celled ovules many in each cell, style filiform, dilated at the top, truncate, stigma columnar or elongate conic. *Fruit* cylindric, of two follicular mericarps, long cohering but at length separating from the two placentas. *Seeds* linear or oblong, attenuate and comose at the apex, albumen scanty, cotyledons oblong linear, flat, radicle superior. — *DISTRIB.* About 12 species, of Tropical Asia, Australia and New Zealand.

Filaments of the stamens twisted spirally around the style, corolla lobes 2 in long —

- Leaves more or less oblong, with 6 to 8 pairs of main nerves, corolla glabrous without, fruit 4 to 7 in long .. 1 *P. spiralis*  
 Leaves more or less ovate, with 10 to 12 pairs of main nerves, corolla pubescent without, fruit 2.5 to 3 in long .. 2 *P. Kunstenii*

Filaments of the stamens not twisted spirally around the style

- Corolla tube cylindric urceolate, lobes spreading, .075 in long, disk deeply lobed, calyx lobes with no or very small scales at base within, main nerves of leaves 6 to 8 pairs 3 *P. stenocarpa*  
 Corolla tube campanulate, lobes erect, 3 in long, disk entire or undulate, calyx lobes with a broad thin scale at base within, main nerves of leaves 8 to 10 pairs . 4 *P. penangiana*

1 *PARSONSIA SPIRALIS* Wall Cat 1631 (1828) An evergreen twining glabrous shrub, branchlets terete. *Leaves* subcoriaceous when green, membranous when dry, ovate oblong or oblong lanceolate, shortly somewhat abruptly and often obliquely acuminate at apex, acute or rounded at base, pale when dry, especially on the lower surface 3 to 7 in long, 1.5 to 3.5 in broad, midrib rather broad, slightly raised beneath main nerves 6 to 8 pairs, the lowest pair close to the base, starting at an angle of about 60° and arching upwards to anastomose near the margin, secondary nerves few, also the reticulations, petiole slender, 5 to 1 in long, often twisted at base, stipular glands small, subulate, the bases of each pair connected by a stipular ridge. *Cymes* axillary, many flowered corymbose, 1.5 to 3 in diameter, peduncles variable in length 1 to 4 in long, secondary peduncles usually 3, 5 to 1 in long, branches usually 3 chotomous ultimate pedicels slender, about .25 in long, bracts and bracteoles small, ovate, flowers greenish or yellowish with a red centre, buds clavate, with short tube and obtusely conical top. *Calyx* tube short, lobes ovate, acute, ciliate, sparsely pubescent without, 1 in long, furnished with an ovate acute sometimes bifid scale at the base of each inside. *Corolla* tube cylindric, .125 in long glabrous on both surfaces, villous at the throat, lobes 2 in long oblong, acute, erect or spreading. *Disk* lobes triangular. *Stamens* inserted near the base of the tube, the filaments spirally twisted together, sparsely pubescent, anther-tails incurved at the base, anther tips acuminate hooked. *Ovary* ovoid, glabrous, style slender stigma columnar with a bifid apex and short basal auricular ring. *Fruit* linear lanceolate, acuminate, 4 to 7 in long, .75 in broad, somewhat compressed, smooth, striate, glabrous. *Seeds* 5 to 7.5 in long, slender, enlarged below, narrowed and cut away on one side above, and furnished with pale golden-brown coma, .75 to 1.5 in long, cotyledons narrow, oblong about .25 in long, radicle

1 in long, slender A DC Prodr VIII 402, Kunz For Fl II 180, Hook f Fl Br Ind III 650, Trimen Fl Ceyl III 134, Cooke Fl Bomb II 135 *P. oblonga*, Wall Cat 1632, A DC l. c. *P. pauciflora* and *P. acuminata*, Wall Cat 1633, 1634 *Helysia javanica*, Blume Bijdr 1043 *Heligme javanica*, A DC l c 425, Miq Fl Ind Bat II. 429. *H. Rheedii*, Wight Ic t 1303 *Spirostemon spiralis*, Griff Notul IV 80, t 411, fig 1 *Aganosma concanensis*, Hook. Ic Pl. t 841 "*Kudici Kodu*," Rheede Hort Mal IX t 9, 10

KEDAH on Lankawi Island, *Curtis*, at Coah, *Curtis* 450, 2109. PENANG *Wallich* 1634, *Curtis* 1707 PERAK *Wray* 2244 MALACCA *Mangay* (K D) 1064 SINGAPORE *Wallich* 1633, *Lobb*, *Kunstler* 69. —DISTRIB. India, Ceylon, Burma, Malay Archipelago, China

2 *PARSONSIA KUNSTLERI*, King & Gamble, n sp A slender climbing shrub, branchlets terete, pale to dark brown Leaves membranous, ovate or ovate-lanceolate, acuminate at apex, rounded or acute at base, yellowish-green when fresh with reddish nerves beneath, dark brown and dull when dry, lower surface paler, sometimes slightly puberulous, especially on the nerves beneath, 3 to 6 in long, 1.5 to 3 in broad, midrib slender, raised above and sinuate when dry, raised beneath main nerves 10 to 12 pairs, the lowest usually close to the margin, starting at an angle of 60° and curving upwards to and along the margin, raised on both surfaces when dry, secondary nerves few chiefly between the upper main nerves reticulations obliquely transverse, prominent on the lower surface, petiole slender, twisted, variable in length from .25 to 1.25 in long, the base swollen, those of each pair joined by a nodal ridge with small acute stipular glands Cymes axillary, corymbose, many-flowered, 2-chotomous, reaching 7 in in length and about 3 in in diam peduncles slender, curved, 3 to 5 in long, secondary peduncles usually 3, 1.5 to 2 in long, cymes about 10 to 12 flowered, pedicels slender, .15 to .25 in long, bracteoles ovate-acute, puberulous, .05 to .1 in long, buds clavate, with short tube and conical head, flowers dark yellow without, reddish within Calyx-tube short, lobes ovate, acute, ciliate, pubescent without, .1 in long, furnished each with an ovate acute, sometimes emarginate scale at its base within Corolla tube cylindric below, .15 in long, pubescent without, villous within at the mouth and between the filaments, lobes oblong, acute, .2 in long, pubescent without, glabrous within Disk-lobes triangular, blunt, .025 in long, glabrous Stamens inserted near the base of the tube, the filaments twisted, sparsely villous, anther-tails incurved at the base, anther tips blunt with a small membranous tip Ovary ovoid, glabrous, style slender, stigma columnar with a conical sometimes bifid tip and basal spreading annular ring Fruit linear lanceolate,

acuminate, 2.5 to 3 in long and 2 to 3 in broad, glabrous, terete, slightly compressed, the mericarps at length separating. *Seeds* slender, 4 to 5 in long, narrowly linear, constricted above and acuminate below, tipped with a 1 in long coma of pale silky hairs, cotyledons narrow, radicle slender.

PERAK in low-lying localities, *Kunstler* (King's Collector) 1824, 5650

3 *PARSONSIA STENOCARPA*, King & Gamble, n sp. A slender twining shrub, branchlets terete, older somewhat channelled, innovations minutely rusty-pubescent. *Leaves* membranous, ovate-lanceolate shortly acute at apex, cuneate or sometimes slightly rounded at base, both surfaces sparsely but minutely pubescent when young, glabrous when old, margins recurved. 2 to 4 in long, 1 to 2 in broad, midrib slender, main nerves 6 to 8 pairs, slender, at about 50° with the midrib, the lowest pair less curving upwards to anastomose near the margin, faint but apparent on the lower surface, as are the reticulations. *Petiole* variable in length, .25 to 1 in long, slender, often twisted near the base. *Stipular glands* very small. *Cymes* axillary, few (8 to 10) flowered umbellate, pubescent. *Poduncles* about 1 in long, *pedicels* slender. 2 in long in flower. 3 in long and rather thick in fruit. *Bracteoles* minute subulate. *Flowers* light yellow. *Buds* short, oblong conical. *Calyx* tube very short. *lobes* ovate acuminate, .125 in long, scales very small or none. *Corolla* tube cylindric urceolate, .15 in long, densely pubescent within in the upper part. *lobes* ovate acuminate, spreading, .075 in long. *Disk lobes* oblong emarginate .025 in long. *Stamens* inserted near the base of the corolla tube. *filaments* slender, radiating to the centre but not spirally twisted. *anthers* hastate acuminate, the tails spreading outwards. *Ovary* ovoid conical. *style* slender, *stigma* columnar with a bifid apiculus at tip and a ring at base. *Fruit* linear, terete, 5 to 7 in long, 2 in broad, rather quickly separating into two terete mericarps. *placenta* flat, very thin. *Seeds* .5 in long, slender, slightly enlarged below, narrowed above and furnished with a coma of golden silky hairs about 1 in long. *cotyledons* oblong, .15 in long. *radicle* slender. 1 in long.

PERAK *Scortechini* 1292. *Wray* 3263. *King's collector* 6062—in dense jungle, at 300 to 500 feet, clinging to trees.

*P. currusepula* K. Schum. of New Guinea, is very near this indeed, and scarcely seems to differ, except in the greater hairiness in the corolla lobes being quite valvate (*Lyonsia*?), and in the calyx lobes being much recurved.

4 *PARSONSIA PENANGIANA*, King & Gamble, n sp. A climbing shrub. *branchlets* slender, dark brown, terete, internodes long. *Leaves* membranous. ovate, acuminate at apex, truncate or rounded at base,

both surfaces olivaceous brown, the lower the paler, margin slightly recurved, 5 to 7.5 in long, 3 to 4 in broad, midrib slender, prominent beneath, main nerves 8 to 10 pairs, the lowest pair close to the margin, those succeeding gradually further apart to above the middle, at an angle of 60° to 70° with the midrib, curving upwards to anastomose near the margin, secondary nerves none reticulations transverse, distant, oblique, petiole 1 to 1.25 in long, slender, bordered above by the decurrent margins of the blade *Cymus* in axillary, corymbose, puberulous panicles peduncle slender, 1.5 in long, flattened branches few, also flattened but shorter, bracteoles ovate acute pedicels 1 to 2 in. long, slender, buds ovoid acute flowers yellowish white *Calyx* tube short, lobes triangular ovate, 0.75 in long, bluntly acuminate, ciliate, each with a broad short very thin scale nearly equalling the base within *Corolla* tube campanulate, not at all constricted, 3 in long, lobes as long as tube, ovate acute, the tip entire or notched pubescent without, glabrous within, except the shaggy villous ring at the insertion of the filaments *Stamens* half exsert, inserted a little below the top of the tube filaments long shaggy villous curved inwards to meet and then upwards but scarcely spiral anthers long sagittate the spurs much incurved the tip membranous apiculate *Disk* cylindrical, entire or slightly undulately lobed .06 in high, glabrous fully enclosing the carpels *Carpels* rounded, glabrous, at first connate afterwards separating style slender, conical above stigma conical, with a spreading ring below and short often bifid tip *Fruit* unknown

PENANG at the Waterfall, *Curtis*

Curtis says this is a rare plant. It differs from the other species in the not constricted campanulate corolla tube, the very broad scale at the base of the calyx within and the entire cylindrical disk. When the fruit is known it may perhaps be found to require a new genus.

# 16 VALLARIS, Burin

Climbing or erect shrubs, or trees. *Leaves* opposite, minutely dotted. *Flowers* white, in axillary fascicles or in dichotomous pseudo axillary cymes. *Calyx* 5 partite, glandular or not within lobes narrow. *Corolla* hypocrateriform or subrotate, throat naked, tube short, lobes broad, contorted, overlapping to the right. *Stamens* inserted at the top of the tube of the corolla, partly exsert, filaments short, anthers sagittate, acuminate, conniving in a cone around and adherent to the stigma, the connective furnished with a large or small dorsal gland, cells with rigid basal spurs. *Disk* annular or cupular, with 5 lobes or scales. *Ovary* of 2 carpels, which are at first connate, ovules many in each carpel, style filiform, stigma thick, obscurely annular at base, often 2 lobed at the tip. *Fruit* oblong, acuminate, separating into 2

follicular mericarps *Seeds* hiseriate, ovate, acuminate or beaked, the apex furnished with a coma, albumen scanty or copious, cotyledons thin or fleshy, large, radicle cylindric, superior — **DISTRIB** Tropical Asia, in India and Malaya, species 5 or 6

A climbing shrub, flowers in branching cymes, anthers with a large dorsal gland .. .. . 1 *V Pergulana*.

Shrubs or trees, flowers in fascicles —

Flowers large, leaves 3 to 4.5 in long, .75 to 2 in broad, anthers with a large dorsal gland .. .. . 2 *V Maingay*

Flowers small, leaves 1 to 2 in long, .5 to .75 in broad, anthers with a small dorsal gland .. .. . 3 *V lanceifolia*

1 VALLARIS PERGULANA, Burm Fl Ind 51 (1768) A climbing shrub, with an unpleasant odour, branchlets terete, pale brown *Leaves* membranous, broadly elliptic or obovate, abruptly and shortly acute at apex, cuneate at base or sometimes rounded, both surfaces glabrous, the lower sometimes puberulous especially on the nerves, 4 to 7 in long 3 to 4 in broad, midrib slender, impressed above, main nerves 7 to 9 pairs, at an angle of from 50° to 60° with the midrib, straight at first curving and anastomosing near the margin, the upper ones meeting a looped nerve secondary nerves very few, reticulations transverse, prominent, petiole .75 to 1.5 in long, slender *Cymes* lax, usually supra axillary, puberulous, reaching 3 in in length and 4 in in breadth peduncles short under .5 in long branches dichotomous pedicels slender, .25 to .5 in long, buds obovate, acute flowers white (*alyx* tube very short, pubescent without, lobes lanceolate, acuminate .3 in long, pubescent, glands very small, alternate with the lobes *Corolla* tube hypocrateriform tube short, cylindric, .2 in long, nearly glabrous, limb .35 in long cleft half way down in ovate abruptly acuminate lobes, pubescent on both sides *Disk* of 5 rounded villous lobes, incurved at tip *Stamens* inserted near the top of the tube within, filaments thick, partly decurrent, anthers sagittate, short-apiculate exserted, .2 in long, the tails slender incurved, the dorsal surface with a large fleshy glabrous rounded gland at the forking of the cells *Ovary* rounded, densely white villous, style slender, stigma conical, with a rounded tip and bifid apiculus *Fruit* not known A DC Prodr VIII 399, Wight Ic t 429 Hook Ic Pl t 153 (*V Pergularia* by error), Hook f Fl Br Ind II 651 *V ovalis*, Miq Fl Ind Bat II 427 *Pergularia glabra*, Linn Mant 53 *Emieria Pergularia*, Roem & Sch Syst IV 101 *Echites hircosa*, Roxb Fl Ind II 18 "*Flos Pergularis*, Rumph Herb Amb V 51, t 29, fig 2

MALACCA Griffith, Maingay (K D) 1063, cultivated — **DISTRIB** India (Bengal?), Ceylon, Malay Archipelago, Siam

2 *VALLARIS MAINGAYI*, Hook f Fl Br Ind III 651 (1882) A large tree (Maingay), a tree 40 to 50 feet high (Curtis), branches stout, with black bark, branchlets closely ringed with transverse cracks. *Leaves* coriaceous, elliptic-lanceolate, obtusely acuminate at apex, acuminate at base, upper surface dark greenish brown, lower pale, glabrous, 3 to 4.5 in long, .75 to 2 in broad, midrib slender, impressed above, main nerves 5 to 6 pairs, prominent beneath, curving upwards to and along the margin, secondary nerves and reticulations distinct beneath, petiole 2 to 4 in long, black. *Flowers* fascicled, 4 to 12 together in one of the axils of each pair of leaves, on alternate sides, the base of the fascicle forming a short tubercle. *Pedicels* variable in length, 2 to 5 in, slender or stout, slightly enlarged under the calyx. *Bracts* or *bracteoles* none, buds about 5 in long, tube and conical head of lobes about equal. *Calyx* tube short, lobes ovate, acute, ciliate .06 in long, glands alternate with the lobes, very small. *Corolla* tube uncelate, .25 in long, mouth constricted, lobes broad, ovate-oblong, folded in bud, 3 in to 4 in long, pubescent on the inner surface. *Anthers* half exserted, apiculate hairy on the ventral surface, a line of hairs near the tip on the dorsal surface. *Dorsal gland* large. *Disk* annular, glabrous with 5 rounded lobes, .05 in high. *Ovary* conical, pubescent, of two combined carpels. *Style* slender. *Stigma* conical, ringed and hairy below. *Fruit* not known.

PI NANG at Batu Feingy and at Government Hill, 2000 feet (Curtis 1767, 2718). MALACCA *Maingay* (K D) 1084. SINGAPORE *Ridley* 4917.

Haviland 3050 from Kalong, Borneo, is clearly a species closely allied to this.

3 *VALLARIS LANCEIFOLIA*, Hook f Fl Br Ind III 651 (1882) A rather stiff epiphytic shrub, branches stout, dark greyish brown, somewhat angled, studded with many conspicuous corky wart-like lenticels. *Branchlets* very slender, pale grey, twiggy. *Leaves* chartaceous, ovate, caudate-acuminate at apex, cuneate at base, glabrous on both surfaces, 1 to 2 in long, .5 to .75 in broad, midrib slender, main nerves very oblique, inconspicuous, parallel, 8 to 10 pairs, joined by an intramarginal slightly looped nerve, reticulations oblique, indistinct, petiole slender, 1 to .25 in long. *Cymes* axillary, few flowered, short (about 5 in long), peduncles about 1 to 2 in long, slender, pedicels very slender, .25 in long, bracteoles minute, ovate-acute, flowers white. *Calyx* lobes ovate, acute, ciliate, with 2 rounded imbricate scales at the base of each, tube as long as lobes. *Corolla* hypocrateriform, tube cylindric, .15 in long, narrowed upwards, pubescent within, lobes linear-oblong, 2 in long, villous at the throat. *Disk* 5 lobed, lobes erose. *Stamens*



inserted near the top of the tube, filaments slender, anthers half-exsert, sagittate, the tip membranous, the spurs slender, rather short, dorsal gland narrow, inconspicuous *Ovary* of 2 glabrous ovate carpels, style slender, with a cup shaped top, stigma almost globose, with a short tip *Fruit* not seen

PENANG on Government Hill, 1,900 feet, Fox 33, Curtis 2146  
 PERAK at Goping, King's Collector 4273 MALACCA Manngay (K D)  
 1102

#### 17 POTTSIA, Hook & Arn

Climbing shrub *Leaves* opposite, with distant nerves *Flowers* small, in lax large terminal and axillary trichotomous paniculate cymes *Calyx* small, 5 partite, with a ring of small glands within at the base of each lobe *Corolla* hypocrateriform tube cylindric, constricted and naked at the throat lobes 5, overlapping to the right, only slightly twisted spreading *Stamens* inserted at the mouth of the corolla tube filaments short, anthers exsert, sagittate, connivent in a cone round the stigma cells with basal empty spurs *Disk* annular, deeply 5-lobed *Ovary* of 2 distinct carpels, style thickened in the middle, attenuate at base and under the ovoid-conical stigma ovules many in each carpel *Fruit* of two follicular mericarps, which are thin, terete, subtorulose *Seeds* linear, elongate, not beaked, with a deciduous coma albumen copious cotyledons linear, flat, radicle superior — *DISTRIB* One species, Indian and Malayan

POTTSIA CANTONENSIS, Hook & Arn Bot Beech Voy 199, t 43 (1836) A large climbing shrub, branches terete, cylindric, branchlets and innovations puberulous *Leaves* membranous, ovate or elliptic ovate, acuminate (usually abruptly and obtusely) at apex, rounded or subcordate at base, glabrous above, also beneath except for slight pubescence along the midrib, 2 to 4 in long, 1 to 2.5 in broad, midrib slender, much raised beneath main nerves 5 to 6 pairs, distant, curved upwards to and along the margin, reticulations in a fine net work, petiole slender, .75 to 1 in long, minutely pubescent, the bases of each pair joined in a thin ridge at the nodes *Inflorescence* 4 to 6 in long, 6 to 10 in broad at top, of trichotomous panicles ending in corymbose drooping cymes primary peduncles 2 to 4 in long, slender, secondary 1 to 2 in long, rest slender, all rusty puberulous or glabrate, pedicels very slender, .5 in long, basal bracts leafy, bracteoles minute, ovate, obovate, caducous, buds slender, clavate, flowers pink *Calyx*-tube very short, lobes ovate, each with 1 to 4 minute scales at the base inside *Corolla* tube cylindric-campanulate, slightly constricted at mouth, 1.5 to 2 in long, lobes spreading, ovate, 1.5 in long, 3-nerved, margins recurved *Anthers* sagittate, smooth on the back with a very small

gland near the apex, which is often hooked, basal cells slender, in curved, filaments pubescent, decurrent inside the corolla tube in a white pubescent ridge to a little way above the base. *Disk-lobes* linear subulate, 1 in long. *Ovary*-carpels short, oblong, pubescent at top, stigma obscurely ribbed. *Follicles* very slender, 1 foot long, flexuous, smooth, thinly coriaceous. *Seeds* black, very slender, glabrous, flat, 1 in long, .075 in broad, enlarged at the apex where they bear the coma, coma white, 1 to 1.5 in long, albumen thin, cotyledons linear oblong, radicle slender. Benth Fl Hongk 222, Kunz For Fl II 190, and Journ As Soc Beng XLVI n 255. Miq Fl Ind Bat II 450. *P. ovata*, A DC Prodr VIII 442. *P. Hookeriana*, Wright Ic t 1306 bis. *Parsonsia ovata*, Wall Cat 1630. *Teysmannia laxiflora* and *Hookeriana*, Miq l c 455, 456, and *Parapottsia*, Addenda 1080. *Vallaris laxiflora*, Blume Bijdr 1043. *Euthodon paniculata*, Griff Notul IV 84, Ic Pl Asiatic 458, fig 2.

KEDAH *Ridley* PENANG *Curtis* 820. PERAK *Wray* 1904, *Scortechini* 1287, 1289. *Curtis* 3337, *King's Collector* 1318, 4657, 5532, 10292, 10988. MALACCA *Griffith Mainyay* (K D) 1095. — *DISTRIB* India (11 Bengal and Assam) Burma Java S China

# 18 WRIGHTIA, B.

Shrubs or small trees, with often slender branches. *Leaves* opposite, penniveined. *Flowers* red, white, or yellowish, in terminal or pseudo axillary corymb like cymes. *Calyx* short, 5-partite with glands or scales inside, lobes obtuse. *Corolla* hypocrateriform tube cylindric, usually short, usually slightly constricted at the throat. lobes 5, overlapping to the left, the throat or the lower part of the lobes usually (absent in *W. religiosa*) furnished with a corona of 5 to 10 scales, which are often lobed or fimbriate, and either distinct or connate in a ring. *Stamens* inserted on the mouth of the tube filaments short, dilated, anthers exserted (almost included in *W. dubia*), sagittate, conniving around and adhering to the stigma, cells usually near the summit, base produced in solid spurs. *Disk* 0. *Ovary* of 2 free or connate, many ovuled, carpels, style filiform stigma ovoid, with usually a toothed basal ring. *Fruit* of 2 connate or distinct follicular mericarps. *Seeds* linear, attenuate at the apex, base with a deciduous coma, albumen scanty or 0, cotyledons broad, convolute, radicle short, superior. — *DISTRIB* Tropical Asia and Australia about 10 species.

Throat of corolla furnished with a corona of scales or fringes —

Corona scales 10, 5 alternate with lobes of corolla, free,

2 lobed, 5 opposite those lobes, adnate below, free above,

- 3-lobed; leaves and inflorescence very tomentose; foli-  
 connate .. .. . 1. *W. javanica*.  
 Corona-scales many, fimbriate from the base; leaves and  
 inflorescence glabrous; foli-connate .. .. . 2. *W. levis*.  
 Corona-scales 5, small, alternate with the lobes of the corolla,  
 not lobed; stamens almost included; flowers large; leaves  
 scarcely pubescent; foli-connate distinct, connate at the tip  
 only .. .. . 3. *W. dubia*  
 Throat of corolla without a corona; flowers very small as are  
 also the leaves; pedicels capillary; foli-connate distinct .. 4. *W. religiosa*

1 *WRIGHTIA JAVANICA*, A. DC Prodr. VIII. 405 (1844). A small tree, reaching a height of 40 feet and a diameter of 12 to 14 in (Curtis), branchlets slender, tomentose, as are the innovations and linear leaf-buds. *Leaves* membranous, elliptic or elliptic-lanceolate, abruptly and obtusely acuminate at apex, acute at base, upper surface minutely pubescent, glabrate when old, lower surface densely tomentose with ferruginous hairs, 3 to 5 in long, 1 to 2.5 in. broad, midrib rather broad, scarcely raised, main nerves 10 to 12 pairs, nearly straight, reddish and sufficiently conspicuous beneath; reticulations obscure, petiole .25 in. long, densely tomentose. *Cymes* terminal, tomentose, 1 to 1.5 in. long and 2 to 3 in. broad, many- (about 15- to 20-) flowered, peduncle none, or about 2.5 in. long, branches 3-photomous, about .4 in. long; pedicels slender, 2 to .3 in. long, bracteoles minute, subulate, buds clavate, the tube short, the head ovoid, inflated, often .5 to .6 in. long and .2 to .3 in. broad, flowers pale waxy-white with greyish centre. *Calyx*-lobes ovate, acute, glabrous within, .05 in long, glands 2 to each lobe, elliptic, the two nearly covering the inside of the lobe. *Corolla*-tube short, .15 in. long, slightly constricted at mouth, glabrous within, lobes oblong, rounded, 5 in long, at last spreading, puberulous on both surfaces. *Scales* 10, 5 alternate with corolla-lobes, free, inserted at base, .2 to .3 in. long, entire or bifid at apex, villous, 5 opposite the corolla-lobes, upper free part inserted nearly half-way up, very short and 2- to 3-lobed, villous, lower part adnate to the tube, glabrous or pubescent, twice as broad as the free ones. *Anthers* hard, stiff, pubescent, .25 in. long, apiculus penicillate, filaments very short, thick, sometimes furnished behind with 2 minute subulate glands. *Fruit* 10 to 12 in. long, rough, prominently beaked, foli-connate. *Seeds* very slender, about .6 in. long, excavate above; testa thin, striate; coma white, silky, 1.5 to 2 in. long, cotyledons broadly ovate, cordate, convolute, .25 in. long, with prominent nerves, radicle short, stout, .075 to .1 in long. Miq Fl. Ind. Bat. II 432, Koord. & Val. Bijdr. I. 112. *W. pubescens*, Blume Bijdr. 1041 not of Br.

KEDAH: at 300 to 500 feet, King's Collector 1762, TONGKA. Curtis

3054. PROVINCE WELLESLEY: at Tassek Glugor, *Curtis* 3738. —  
DISTRIB. Java (Koorders 13799, 13800, 13802, 14232).

In appearance this species would at first sight be taken for *W. tomentosa*, Roem. & Sch., but it is distinguished by the larger buds, shorter corolla-tube, and, above all, by the quite different corona-scales.

2 *WRIGHTIA LÆVIS*, Hook. f. in Fl Br Ind. III. 654 (1882). A glabrous shrub or small tree, reaching 15 to 20 feet in height, branchlets slender, terete, very pale brownish-yellow. *Leaves* membranous, elliptic or elliptic-oblong, abruptly caudate-acuminate at apex, cuneate at base, shining above, dull and pale beneath, blueish when dry, 3 to 6 in long, 1 to 3 in broad, midrib slender, raised and usually nearly white beneath, main nerves 4 to 7 pairs, the lowest pair very near the margin, all arching upwards to and along the margin, secondary nerves and transverse reticulations pale, forming an elegant network especially conspicuous below, petiole very short, 1 to 2 in. long. *Cymes* corymbose, 3-chotomous, pseudo-terminal, about 2 in long and 2.5 in. broad, peduncles flattened, up to about 1 in long, secondary peduncles also flattened, 2.5 to 3 in long, pedicels slender, .5 to .75 in long, often deflexed, bracteoles minute, ovate-lanceolate, flower-buds ovoid, flowers about .5 in. in diameter, blood-red (Maingay). *Calyx*-tube very short, lobes ovate, rounded, ciliolate, nerved, .06 in long, each with 1 to 2 minute scales near the base. *Corolla*-tube very short, .05 in long, glabrous, lobes oblong, minutely pubescent, .25 in. long, corona-scales fimbriate from the base, laciniae glabrous, .2 in. long. *Stamen*, exsert, filaments very short, thick, anthers sagittate, the connective villous on both sides, cells near the top only, very short. *Ovary* ovoid, glabrous, style slender, with an obconic top, stigma short, rounded. *Follicles* 7 to 8 in long, connate, slender. *Seeds* very long (1.5 in), slender, glabrous, striate.

POONGAH: *Curtis* 2943. PERAK: at 300 ft., *Wray* 3504, *Scortechini* 63, 77, *King's Collector* 8614 MALACCA on Mount Ophir, *Maingay* (K.D.) 1065 SELANGOR. *Ridley* 7566, at Ginting Bidai.—DISTRIB. Sumatra (*Forbes* 2605).

3. *WRIGHTIA DUBIA*, Spr. Syst. Veg. I. 638 (1825). A shrub, 2 to 8 feet high, branches stout, lenticellate, branchlets also thick, terete, pale brown, innovations minutely pubescent. *Leaves* chartaceous, oblong- or obovate-lanceolate, acuminate at apex, attenuate at base, sometimes almost rounded; dull on both surfaces, on the upper scaberrulous, scarcely pubescent, dark, paler beneath; 3 to 6 in. long, 1 to 1.5, rarely to 2, in. broad; midrib slender, smooth, pale, prominently raised beneath, main nerves 8 to 12 pairs, the lowest very close to the margin,

the rest at irregular distances but rather oblique, arching upwards to and along the margin, secondary nerves few, reticulations distinct, all pale and easily seen on the lower surface, petiole extremely short, 0 to 2 in long. *Cymes* axillary and pseudo-terminal, few- (1- to 6) flowered, secund, peduncles very short, pedicels pubescent, 25 in long, bracteoles very small, pubescent, ovate-acute, sheathing the bases of the pedicels and at intervals along them, buds oblong-ovoid or fusiform, 1 to 1.5 in long, flowers scarlet, orange without. *Calyx*-tube short, lobes ovate acute, ciliolate, otherwise glabrous, 1.25 in long, 3 of them with two small, thin, rounded, membranous, lobed scales at base, the scales one third to one-half the length of the lobes. *Corolla* hypocrateriform, tube campanulate, 2.5 to 3.5 in long, lobes spreading, 4 to 5 in long, linear-oblong or acuminate, glabrous on both surfaces as in the tube, mouth with 5 small, ligulate, rounded, corona scales alternate with the lobes and sometimes joined by a slightly thickened ridge. *Stamens* only slightly exsert, filaments very broad, anthers sagittate, produced in a short membranous tip, the basal spurs straight or incurved, connective faintly pubescent on the back. *Ovary* glabrous, conical, style thick, 1 in long, stigma conical, with an annular ring. *Follicles* distinct, at first cohering at the apex, 8 to 12 in long, 2.5 in broad, acuminate, striate. *Seeds* linear, 7.5 in long, pointed at both ends, the lower furnished with a long, deciduous, white, silky coma, testa thin, striate, albumen very thin, cotyledons convolute, cordate, 2.5 in long, radicle cylindric, 1.5 in long. *Camararia dubia*, Sims Bot Mag t 1646 (1814). *Strophanthus Jackianus*, Wall Cat 1643, A DC Prodr VIII 419, Miq Fl Ind Bat II 442, Hook f Fl Br Ind III 655, Hook Ic Pl t 1521, Pax in Engl Bot Jahrb XV 380, Fiauchet in Nouv Arch Mus Paris, 3, Ser v 260, Gilg in Engl Monog 12.

TRANG in open jungle, on hilly ground at 200 to 300 ft, *Kunstler* 1400. JUNKSEYLO (Tongka) *Curtis*. PENANG *Jack*, *Wallich* 1643, *Curtis* 188.

We consider that this species is rightly placed in this genus rather than in *Strophanthus* on account of the structure of the seeds but the stamens are much less exsert than is usual in *Wrightia* and the corona lobes are not cleft. There is in the Kew Herbarium an excellent drawing of a flowering and fruiting branch by Mrs Hutton.

*Curtis's* No 2915, from Junkseylon (Tongka), marked *Strophanthus* sp, an erect shrub 4 to 5 ft high, with brick red flowers, has exactly the flowers of *Wrightia dubia* but the leaves are membranous, elliptic short acuminate at apex, cuneate at base, 7.5 in long and 2.75 in broad. It cannot, however, be separated as a species, and may be called var *membranifolia*, King & Gamble.

4 *WRIGHTIA RELIGIOSA*, Benth in Gen Pl II 713 (1876) A small shrub or tree, branches stiff, grey, branchlets also stiff, twiggy, innovations scabrous-papillose. *Leaves* membranous, small, ovate lanceolate, obtusely acuminate at apex, cuneate at base, those of young shoots linear oblong, glabrous on the upper surface except for the crisped pubescence on the midrib, glabrous on the lower, the midrib only slightly pubescent, 5 to 15 in long, 3 to 7 in broad, those of the shoots 2 to 25 in long and 5 in broad, midrib slender, crisped pubescent, main nerves about 4 pairs (shoot-leaves up to 10 pairs or more), curved upwards to join in a faint intramarginal nerve, secondary nerves and reticulations inconspicuous. *Petiole* slender, scarcely 1 in long. *Cymus* terminal, few (up to 12) flowered, main peduncles fairly stout, flattened, 2 in long, secondary peduncles 1 to 4, about 1 in long. *Pedicels* capillary, 5 to 7 in long, curved and twisted. *Bracteoles* minute ovate, buds ovate oblong. *Flowers* white. *Calyx* lobes ovate, acute, ciliate, with a few (about 5) blackish scales near the top of the tube inside. *Corolla* tube cylindric, glabrous, 15 in long, lobes ovate orbicular, very thin, nervose, 25 to 3 in long, glabrous, corona-scales none. *Stamens* long exsert, filaments rather slender, 1 in long, anthers linear lanceolate, cells near the summit, connective thickened. *Ovary* ovoid, glabrous. *Style* slender, stigma conical. *Stylodes* straight, linear, toreto, 3 to 6 in long divergent at an angle of about 20° to 40°. *Seeds* linear, 3 to 4 in long somewhat blunt at both ends, furnished below with a white silky coma 1 to 15 in long. *Testa* striate, faintly puberulous. *Hook f Fl Br Ind III 653, Kunz For Fl II 194 Echites religiosa*, Toysm & Binnend Hort Bogor 126.

SIAM<sup>4</sup> STARKS at Kasoom, *Curtis* 3241 MALACCA *Mangay* (K D) 1071 SINGAPORE *T Anderson* 115, *Mangay* (K D) 3334 cultivated only -DISTRIB Siam (*Schomburgk* 132) Tenasserim

#### Subtribe 2 —NIRINÆ

#### 19 SIROPHANTHUS, DC

Small trees or shrubs often climbing. *Leaves* opposite, pinnately veined. *Flowers* usually large in terminal cymes. *Calyx* 5 partite, scales 5 to many within at the base of the lobes. *Corolla* funnel shaped, tube short, campanulate or urceolate at the mouth and furnished with 10 free or connate corona-scales, lobes 5, twisted, overlapping to the right, sometimes produced in long or short tails, rarely ovate acute. *Stamens* inserted at the top of the tube, included, filaments short.

\* The corona scales may be either considered as 10, free or connate, or as 5, often cleft to the base

anthers sagittate, more or less acuminate or produced in a long bristle, connivent around the stigma and adhering to it, cells pollen-bearing near the top only, produced at the base in empty spurs *Disk* none *Carpels* 2, distinct, style slender, stigma thick, columnar or conical with a membranous reflexed frill at the base, tip simple or bifid, ovules many in each carpel, many-seriate *Fruit* of two follicular mericarps, oblong or elongate, hard, divergent or divaricate *Seeds* compressed, fusiform, narrowed into a long, feathery-plumose point, base with a deciduous coma, albumen scanty, fleshy, cotyledons oblong, plano-convex -- **DISTRIB** Tropical and South Africa and Tropical Asia, about 40 species

Lobes of the corolla exceeding the tube in length --

Lobes of the corolla more than 1 in long, main nerves of leaves conspicuous, corona scales falcate acuminate --

Leaves 3 to 5 in long, calyx lobes acuminate from an ovate base, 25 in long, bracts short

1 *S. dichotomus*

Leaves 1 5 to 3 in long, calyx lobes subulate lanceolate 5 in long, bracts long similar to calyx lobes

2 *S. Wallichii*

Lobes of the corolla scarcely 75 in long, blunt at tip, main nerves very obscure, corona scales a short crenate fold

3 *S. perakensis*

Lobes of the corolla almost as long as the tube, leaves 2 to 4 in long, main nerves conspicuous, corona scales linear falcate, calyx lobes ovate acute, 1 in long

4 *S. singapuriensis*

1 **STROPHANTHUS DICHOTOMUS**, DC in Bull Soc Philom Paris III 123 (1802) An erect or straggling sarmentose shrub, 9 to 10 ft high, branches stout, as are the branchlets, bark of branchlets dark brown with prominent lenticels *Leaves* chartaceous, often membranous when dry, elliptic, elliptic oblong or -obovate, more or less abruptly shortly acuminate at apex, cuneate at base, both surfaces glabrous, margins recurved, 3 to 5 in long, 2 to 3 in broad, midrib prominent, impressed above, raised beneath, main nerves 8 to 9 pairs, impressed above, raised beneath, starting at an angle of about 70° with the midrib and slightly curved upwards to meet in a prominent intramarginal looped nerve at a little distance from the edge, secondary nerves few, between the main nerves, reticulations oblique, impressed above, petiole 25 in long, articulate *Cymes* dichotomous, peduncle short, stout, up to 5 in long, branches short, corymbose, with ovate-acuminate, caducous bracts about 15 in long, pedicels stout, 3 to 5 in long, bracts small, ovate-acute flowers whitish or greenish with dark purple corolla-tails *Calyx* with very short tube, lobes glabrous, acuminate from an ovate base, 25 in long, furnished within at the base with a pair of ovate-acute, entire or bifid scales *Corolla* tube slightly cylindric at first, then funnel-shaped, 75 in long, lobes rounded at first, 5 in.

long, ending in very long, up to 4 in. or more, slender tails; corolla-scales alternate with the lobes, cleft nearly to the base, divisions linear-falcate on a broad base .2 to .25 in. long. *Anthems* pubescent on the back; tips produced in a very long, slender bristle, filaments broad, decurrent within the tube. *Ovary* glabrous; style stout, upper part rugose; stigma with a reflexed fringe. *Follicles* very large, divergent, about 8 in. long by 2 in. broad, broadest at the base where united, tapering to a broad rounded point. *Seeds* compressed, fusiform, 7 in. long, produced in a long beak, the upper part of which, about 1 in. long, is furnished with a brush-like coma of white silky hairs, 1 in. long or more, testa thin, dark brown, albumen very thin, cotyledons oblong, somewhat auricled at base, .4 in. long, .15 in. broad, radicle cylindric, .25 in. long. A. DC. Prodr. VIII. 417, Bl. Bijdr. 1044, Miq. Fl. Ind. Bat. II. 441; Hook. f. Fl. Br. Ind. III. 655. *S. Horsfieldianus*, Miq. l. c. 442. *S. scandens*, Roem. & Sch. Syst. IV. 412. *S. longicaudatus* and *S. Griffithii*, Wight l. c. t. 1299, 1300, Miq. l. c. 442. *S. caudatus*, Kurz in Journ. As. Soc. Beng. XLVI. 257 and For. Fl. II. 191, Pax in Engl. Bot. Jahrb. XV. 263, Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 263, Gilg in Engl. Monog. 16. *S. pentaphyllus*, Griff. Notul. IV. 78. *Echites caudata*, Burm. Fl. Ind. 68, t. 26. *Nerium caudatum*, Lamk. Dict. III. 458.

PERAK. Wray 1668, 3306, *Scortechini* 1819, 1740, King's Collector 3896, 8628 MALACCA Griffith, Mangay (K.D.) 1073, Lobb —  
DISTRIB. Tenasserim, Java

2. STROPHANTHUS WALLICHII, A. DC. Prodr. VIII. 418 (1844). A climbing glabrous shrub; branchlets slender, terete, bark brown with many prominent lenticels. *Leaves* membranous, elliptic-oblong or -obovate, abruptly and shortly acuminate at apex, cuneate to almost rounded at base, plicately folded when young, upper surface dull, dark, lower surface pale, margins undulate, recurved, 1.5 to 3 in. long, .75 to 1.25 in. broad, midrib prominent, flattened beneath, slightly unpressed above, main nerves 7 to 8 pairs, at an angle of about 60° with the midrib, curving upwards to join in an intramarginal looped nerve well within the margin, secondary nerves and reticulations in an elegant network, all, with the main nerves and midrib, prominent on the under surface by their colour darker than that of the tissue, petiole slender, .25 in. long. *Cymes* dichotomous, spreading, reaching 3 in. long and 3 in. in breadth at the corymbose top, main peduncles 1 to 1.5 in. long, secondary peduncles about .4, up to 1 in. long; tertiary peduncles and pedicels slender, about .25 in. long, bracts or bracteoles at each joint in pairs similar to the calyx-lobes, linear-lanceolate, recurved, .25 to .35 in. long, minutely pubescent, flower-buds slender, flowers pink or yellow with



faint reddish stripes *Calyx*-lobes subulate-lanceolate, 5 in long, reflexed in flower, minutely pubescent, scales at base very minute, often wanting *Corolla*-tube cylindric-funnel shaped, as long as the calyx-lobes lobes ovate acuminate, produced into slender tails reaching 2 to 3 in long, corona-scales cleft to the base, each half falcate acuminate, about 15 to 2 in long *Anthers* very narrow, produced in long slender soft awns up to 5 in long, the awns twisted together in the flower, connective on the back and lower part of awns minutely pubescent, filaments broad, decurrent half-way down the tube *Ovary* glabrous, depressed, style slender, slightly pubescent *Fruit* not known Pax in Engl Bot Jahrb XV 378 Franchet in Nouv Arch Mus Paris, 3<sup>e</sup> sér V 268, Gilg in Engl Monog. 16, Hook f Fl Br Ind III 655, Miq Fl Ind Bat II 442, Ptain Beng Plants 677 *S. dichotomus*, Wall Cat 1641, Wight Ic t 599 Lodd Bot Cab t 759, Grah in Maund Bot III t 150 *S. caudatus*, Kunz For Fl II 193 *Nerium caudatum*, Roxb Fl Ind II 9, Burm Fl Ind t 26

JUNAKSEYLOH ISLAND (Tongku) Curtis 2931 TRANG Kings Collector 1387 or 1397 (?) —DISTRIB India (Circars, Khasia Hills, Chittagong and Tenasserim)

3 STROPHANTHUS PERAKENSIS, Scootchini MS in Herb Calc A slender climber, branchlets slender, glabrous, lenticellate *Leaves* thinly coriaceous when green, membranous when dry, glabrous, elliptic oblong, acuminate at apex acute at base, both surfaces somewhat pale, the lower paler margins crispate slightly recurved 2 to 3.5 in long, .75 to 1 in broad, midrib thick, impressed above, prominently raised beneath, main nerves very obscure, 10 to 12 pairs, leaving the midrib at an angle of about 70° and nearly straight, joining near the margin in a very faint intramarginal looped nerve reticulations not visible petiole .25 in long, channelled above and bordered by the decurrent margins of the blade *Cymes* slender few flowered, about 1 in long and 1 in in diam, trichotomous peduncle .25 to .5 in long secondary peduncles rather shorter, bearing 3 terminal flowers, pedicels slender pubescent, about 1 in long bracts and bracteoles in pairs at all nodes, ovate and dark red at base, long acuminate, 1.5 to 2 in long buds slender, fusiform, flowers yellowish green *Calyx* lobes ovate lanceolate, acuminate, 2 in long, the three inner with two minute obtuse scales at the base within *Corolla* tube urceolate, constricted at the mouth, as long as the calyx lobes, lobes ovate cordate at base, long acuminate with a blunt tip, 5 to 7 in long, corona scales cleft to the base, scarcely more than a short crenate fold *Stamens* included, filaments short, decurrent half-way to the base of the tube and ending in an obtuse spur, anthers sagittate, the connective produced in a soft pubescent tip as long as the

anthers, pubescent on the back *Ovary* ovoid, glabrous, style thick, rough, stigma cylindric with a short fringe below and a point at the apex *Fruit* not seen

PERAK at Dipong, *Scortechini* 1818

4 STROPHANTHUS SINGAPURIANUS, Gilg in Engl Monog 11 (1903)  
A straggling shrub, branchlets slender, brown, thickly covered with white lenticels *Leaves* elliptic or elliptic oblong, abruptly and shortly acuminate at apex, acute at base, dull on the upper surface and dark brown when dry, paler on the lower, margins crispately undulate, recurved, 2 to 4 in long, 1.5 to 2 in broad, midrib stout, impressed above, prominently raised beneath, main nerves 6 to 8 pairs, starting at an angle of about 70° and curving upwards to meet in an intramarginal deeply looped nerve, secondary nerves and reticulations well-marked beneath, petiole 2.5 to 4 in long, bordered by the decurrent margins of the blade *Cymes* dichotomous on a peduncle 2.5 to 1 in long, reaching 2 in in length and about 2 in broad at the corymbose top, much peduncles and pedicels rather stout, of varying length, pedicels greatly enlarged in fruit, bracts and bracteoles in pairs at all nodes, ovate acute, about 1.5 in long, buds clavate flowers purple *Calyx* lobes ovate-acute, glabrous, 1 in long, inner three furnished with 2 to 4 small glands at the base inside *Corolla* tube cylindric, sometimes a little constricted at the mouth, 2.5 in long, lobes as long as tube, ovate acute campanulate corona scales linear falcate, cleft to the base, 1 in long *Anthers* produced in slender soft filiform awns, filaments pubescent, flattened, decurrent about half-way down the corolla-tube *Ovary* ovoid, glabrous style pubescent *Follicles* 8 in long by 5 to 7.5 in broad, base broad, middle slightly turgid, then tapering to a long hard curved point, divergent so as to lie in the same straight line, pericarp terete, smooth *Seeds* oblong-lanceolate, 7.5 to 1 in long, 1 in broad, pointed above, produced below in a long feathery plumose point, the coma white, soft, testa pale brown, puberulous *S. brevicaudatus*, Wright Ic t 1302 (1850), Hook f Fl Br Ind III 656, Kurz For Fl III 191 and Journ As Soc Beng XLVI n 257, Pax in Engl Bot Jahrb XV 380 Franchet in Nouv Arch Mus Paris, 3<sup>e</sup> sér V 259 *Cercocoma singapuriensis*, Wall Cat 1623, G Don Gen Hist Diehl Pl IV 83, A DC Prodr VIII 432, Miq Fl Ind Bat II 445

MALACCA Griffith, *Mangay* (K D) 1072 Derry 528 SINGAPORE Wallich 1623, Lobb, Kurz, Ridley 6040, 9149, King's Collector 1191 —  
DISTRIB Mergui (?), Borneo (*Haviland* 1770, *Beccari* 797, *Motley*)

## Subtribe 3 — ECHITIDINÆ

## 20 URCEOLA, Roxb

Large climbing shrubs. *Leaves* opposite, penninerved. *Flowers* small, in dense corymbosely paniced cymes at the ends of the branchlets. *Calyx* 5-partite, without glands within lobes oblong or linear. *Corolla* urceolate or subglobose, throat naked, lobes 5, short, valvate, subinduplicate. *Stamens* attached to the base of the corolla, included, filaments very short. anthers sagittate, scarcely acuminate, connivent around the stigma and adhering to it at their middle. cells produced at the base in empty spurs. *Disk* cupular or annular, truncate or shortly 5 lobed. *Ovary* of 2 distinct cupels, longer than the disk, many ovuled, style short. stigma oblong conic, subinnulate at the base. *Fruit* of 2 spreading follicular mericarps, thick and acuminate or elongate, constricted or not between the seeds. *Seeds* oblong or linear, compressed, villous. tip contracted, bearded with long persistent brown hairs and crowned with a long white deciduous coma. albumen scanty, cotyledons flat foliaceous. radicle short. — **DISTRIB.** Malay Peninsula and Archipelago. about 7 to 8 species.

Follicles straight even, terete, slender not constricted between the seeds —

Follicles in one line or very slightly curved either way —

Leaves rusty pubescent beneath, calyx lobes linear, 1 to 15 in long, much recurved

1 *U. elastica*

Leaves nearly or quite glabrous beneath —

Leaves somewhat glaucous beneath, calyx lobes broad obtuse little recurved, corolla urceolate

2 *U. Mangaya*

Leaves reddish brown beneath, calyx lobes ovate, very small, under 0.5 in long, corolla globose

3 *U. brachysepala*

Follicles recurved, leaves red brown beneath when dry, calyx lobes longer than corolla

4 *U. malaccensis*

Follicles porriard shaped thickened in the lower part, long pointed above, calyx lobes very short, leaves red brown when dry

5 *U. lucida*

Follicles torulose, thickened opposite the seeds and constricted between them, leaves red brown when dry

6 *U. torulosa*

SPECIES IMPERFECTLY KNOWN 7 *U. reticulata* 8 *U. sp*

1 URCEOLA ELASTICA, Roxb in As Res V 167 (1799) with fig (*excl fruit*) A large climbing shrub, branches thick, with dark brown bark, branchlets slender, often flexuose, innovations pubescent. *Leaves* coriaceous, ovate or elliptic ovate, abruptly acuminate at apex, rounded at base, upper surface glabrous except on the midrib and main nerves, lower rusty-pubescent, but reddish brown when dry, margin strongly

recurved, often with thicker pubescence beneath; 4 to 7 in. long, 2 to 3·5 in. broad; midrib stout, slightly impressed above; main nerves 10 to 12 pairs, strongly marked beneath, slightly impressed above, at an angle of about 60° with the midrib, straight at first and then curving and anastomosing near the margin; secondary nerves none, reticulations transverse, fairly regular; petiole ·5 to 1 in. long, rusty-pubescent, twisted at the base, the bases of each pair joined by a ridge at the node. *Inflorescence* finely rusty-pubescent, trichotomous, up to 12 in. long and 8 in. broad; main branch peduncles 2 to 2·5 in. long, secondary branch peduncles 1 to 1·5 in. long; cymules terminal, corymbose or subumbellate, many- and densely-flowered, ·05 to ·1 in. long; bracts leaf-like, bracteoles linear-subulate, ·1 to ·25 in. long, flowers very small. *Calyx*-tube short, lobes linear, ·1 to ·15 in. long, recurved. *Corolla* urceolate, tube ·05 in. long, glabrous within, except a tuft of reflexed hairs between the stamens, lobes oblong, a little longer than the tube. *Anthers* acuminate, pollen-cells at the top, filaments broad, short, minutely pubescent. *Ovary* globose, pubescent, style short; stigma conical. *Follicles* connected at the base, straight, horizontal or sometimes recurved, cylindric, acuminate, brown-velvety-pubescent when young, smooth and glabrous when old, about 6 in. long and ·3 in. broad. *Seeds* linear-oblong, 5 in. long, flattened, surmounted by a ring of tawny bristles, from the centre of which arises a coma of white silky hairs 1·5 to 2 in. long, testa slightly tawny-villous, albumen very scanty, cotyledons oblong, radicle rather long. A DC. Prod. VIII 358, Wight Ic t. 473 (*excl figure and description of fruit*), Miq. Fl. Ind. Bat II 416, Hook. f. Fl. Br. Ind. III 656. *Tabernaemontana elastica*, Spreng. Syst. Veg. 1. 639. ? *Vahea gummufera*, Poir. Dict. Suppl. V. 409.

PENANG Roxburgh (*Howison and C. Campbell*); Curtis 823, King's Collector 1749. PERAK Wray 595, 1812, 2308, 2599, 4273; King's Collector 2241, 2447, 3597, 4239, 4886, 5061, 7567, 10348. SELANGOR: Goodenough 10600. MALACCA: Griffith, Maingay (K.D.) 1058, 1091, Cantley, Derry 404, 1024, 1031; Curtis 3477.—DISTRIB. Sumatra.

As noted by Hook. f. in Fl. Br. Ind., the fruit figured and described by Roxburgh, Wight, and A. DC. as that of *U. elastica* is that of *Orchipeda fatida*, Blume, a Javanese tree.

2. URCEOLA MAINGAYI, Hook. f. in Fl. Br. Ind. III 658 (1882). A large climbing shrub, branchlets nearly black, terete, more or less rusty-pubescent as are the innovations. *Leaves* coriaceous, elliptic, abruptly acuminate at apex, narrowed or rounded at base, glabrous and shining greenish brown on the upper surface, pale and dull and more or less glaucous on the lower, glabrous or minutely pubescent, margins recurved, 2·5 to 5·5 in. long, 1·5 to 3 in. broad, midrib prominent,

dark, impressed on the upper surface, main nerves 8 to 10 pairs, prominent, starting at an angle of about  $70^\circ$  with the midrib and curving upward to anastomose near the margin, secondary nerves few, reticulations transverse, prominent, more or less raised above petiole 4 to 6 in long. *Inflorescence* minutely rusty pubescent, trichotomous, up to 8 in long and 5 in broad, main branch peduncles 2 to 2.5 in long, secondary rather shorter, cymules terminal, corymbose or subumbellate, pedicels slender, 1 in long, lower bracts leaf like, bracteoles linear subulate, 2 in long, flowers very small. *Calyx* tube very short lobes ovate oblong, little recurved, obtuse at tip, 1.25 in long. *Corolla* urceolate, tube very short, glabrous within, lobes oblong, rather longer than the tube. *Anthers* sagittate, obtuse at apex, the tails diverging. *Ovary* globose, pubescent. style obconical stigma conical with a short bifid apiculus. *Locules* connected at the base, diverging nearly horizontally 6 to 8 in long, 2.5 in broad, usually hooked at the tip. pericarp terete dark brown glibrous. *Seeds* linear oblong flattened 6 in long surmounted by a ring of tawny bristles and a coma of white silky hairs 1 in long. testa softly tawny villous. albumen very scanty. cotyledons oblong radicle rather long.

PERAK *Kings Collector* 4743, 5134. *Wray* 2367 (young follicles curving inwards almost to a circle). MALACCA *Hullett*. SINGAPORE *Mungray* (K D) 1083. *Ridley* 2717. —DISTRIB Borneo (*Haviland* 1527, 1767 3197).

3 URCEOLA BRACHYSEPALA Hook f in Fl Br Ind III 659 (1882). A climbing shrub, branchlets slender dark brown terete. *Leaves* chartaceous perhaps coriaceous when green elliptic abruptly obtusely acuminate at apex rounded at base both surfaces smooth, red brown when dry margins slightly recurved 4 to 5.5 in long, 1.5 to 2.5 in broad midrib prominent rather slender main nerves 6 to 8 pairs, starting from the midrib at an angle of  $70^\circ$  to  $75^\circ$  and curved upwards to and along the margin only the upper few meeting in an intra marginal nerve rest anastomosing, all prominent raised on the upper surface as are the prominent transverse reticulations, petiole slender, 5 to 1 in long, articulate near the base. *Inflorescence* puberulous, trichotomous, terminal on main or side branchlets, up to about 6 in long and 5 in broad, main peduncle 1 to 2 in long, terete, secondary peduncle also about 1 to 2 in long flattened as are further branches, cymules corymbose, pedicels slender, often recurved, bracts leafy, bracteoles subulate, reddish, numerous, buds globose, flowers minute (*calyx*-lobes very small, ovate, 0.3 to 0.4 in long, very slightly puberulous. *Corolla* globose, villous without, glabrous within, except for tufts of hair between the stamens, inflated 0.75 to 1 in long lobes induplicate

*Anthers* acute or very minutely apiculate, spurs slightly incurved. *Ovary* villous, style obconical, stigma conical, annulate at base. *Follicles* usually horizontal, in one line, sometimes slightly curved backwards, terete, 6 to 8 in long, 2 in. broad, acuminate and slightly hooked at apex. *Seeds* flattened, 4 to 5 in long, ending in a tuft of bristles and a milky-white coma about 1.5 in long. *testa* tough, densely rusty-villous.

PENANG *Curtis* 403 PERAK *Scortechini* MALACCA *Mangay* (K D) 1079, 1080, *Curtis* 3478, *Goodenough* 1564, *Ridley* 1610, 2727, 6937, 8397, 9125, 10772

4 URCEOLA MALACCENSIS, Hook f in Fl Br Ind III 658 (1882) A large climbing shrub, glabrous except the innovations and the inflorescence, branchlets nearly black, terete, rather slender. *Leaves* coriaceous ovate or ovate-oblong, obtusely caudate acuminate at apex, rounded at base, upper surface pale green, pale when dry, lower red brown when dry, both surfaces smooth margins slightly recurved. 2 to 4.5 in long, 1 to 2 in broad midrib strong impressed above, raised beneath, main nerves 6 to 8 pairs slender prominently marked on both surfaces, stating at an angle of about 60° with the midrib and curved upwards to and along the margin intramarginal nerve only near the tip, reticulations transverse regular. *Petiole* 5 to 7.5 in long, slender, articulate near the base the bases of each pair of leaves joined by a slender ridge at the node. *Inflorescence* of terminal or axillary cymes, hoary pubescent, tichotomous, about 2 in long and 3 in broad, cymes many flowered, congested, corymbose peduncles about 1 to 1.25 in long, flattened, secondary peduncles about 1 in long, rest smaller, bracts leafy, bracteoles very many, linear oblong, similar to the calyx lobes, buds globose. *Calyx* lobes linear oblong or almost spatulate, unequal, recurved, up to 1 in long. *Corolla* tube very short, lobes oblong, induplicate, glabrous within except for a small tuft of hair between the stamens. *Anthers* obtuse, with a rounded apiculus, spurs straight. *Ovary*-carpels hirsute, style obconic, stigma conical, tip bifid. *Follicles* slender, terete, acuminate, 8 to 9 in long, 2 in broad, slightly curved, recurved so that the angle between them is about 240°. *Seeds* oblong-fusiform, acuminate at the base, the tip furnished with a ring of bristles enclosing the white, silky, about 2 in long, coma, testa thin, villous, with golden-silky stiff hairs.

PERAK *King's Collector* 4464, *Ridley* 9666 MALACCA *Mangay* (K D) 1098, 1082, part SELANGOR *Curtis* 2395 JOHORE *Ridley* 9158, *G King* SINGAPORE *Hullett* 846, 909, *Cantley* 121

5 URCEOLA LUCIDA, Benth in Gen Pl ii, 716 (1876) A climbing shrub, glabrous except the inflorescence, branchlets slender, nearly black, terete. *Leaves* chartaceous, elliptic or elliptic oblong, abruptly

acuminate at apex with a usually oblique acumen, rounded at base, shining on both surfaces, red brown when dry, margins slightly recurved, 3 to 5 in long, 1.25 to 2 in broad, midrib strong, very prominent beneath slightly impressed above, main nerves 8 to 12 pairs, slightly impressed above, very strong beneath, starting at an angle of nearly 60° with the midrib and curved upwards to and along the margin, where they meet to form almost an intramarginal looped nerve, reticulations transverse, regular, petiole slender, 5 to 1 in long, often twisted. *Inflorescence* of large terminal and axillary dichotomous panicles of cymes, reaching in all 1 ft in length and breadth, peduncles and branches slender, uppermost only pubescent, main peduncles 2 to 3 in long, secondary 1 to 1.5 in long, tertiary about 5 in long, cymes corymbose pedicels short bracteoles ovate acuminate, very small buds globose or ovoid. *Calyx* tube short, lobes broadly oblong, recurved, 0.5 in long. *Corolla* urceolate, 1 in long, tube very short lobes oblong, longer than the tube, pubescent without, glabrous within. *Anthers* obtuse at the apex. *Ovary* glabrous or slightly hairy at the tip, style short stigma conical. *Follicles* 3 to 4 in long, horizontal, rigid (like poniards), base contracted, tip acuminate, 4 to 5 in broad at the broadest a little above the base. *Exocarp* thick. *Endocarp* crustaceous. *Placenta* woody. *Seed*s linear oblong, 3 to 5 in long, flattened ending in a tuft of tawny bristles, which encloses a white silky spreading coma about 1 in long. *Testa* crustaceous, rusty silky pubescent. *Cotyledons* foliaceous, 3 in long radicle 2.5 in long. Hook f Fl B1 Ind III 658 *Chavannesia lucida*, A DC Prod VIII 444 *Echites ? lucida*, Wall Cat 1670, G Don Gen Hist Dichl Pl IV 75

PENANG Wallich 1670, Curtis 661, 941, 3569, King's Collector 1329 PERAK Scortechini 17, King's Collector 4929 MALACCA Derry 333, 978, 1158, 1169 SINGAPORE Hullett 860, Ridley 2745, 5628, 6937

6 URCEOLA TORULOSA, Hook f in Fl B1 Ind III 659 (1882) A climbing shrub, glabrous except the inflorescence, branchlets rather slender, very dark brown, terete. *Leaves* thinly coriaceous, ovate-oblong or oblong lanceolate, acuminate at apex, acute or rounded at base, smooth on both surfaces, red brown when dry, margin slightly recurved, variable in size, usually 4 to 7 in long, 1.5 to 2 in broad, but on end branchlets sometimes as small as 1 to 1.5 in long and .75 to 1 in broad, midrib slender, impressed above, main nerves very slender, 6 to 10 pairs, at about 50° to 60° with the midrib, curved upwards to and along the margin, where they anastomose, reticulations transverse, not prominent. *Petiole* about 5 in long, articulate near the base. *Cymes* terminal on side branchlets as well as on main branchlets, 2 to 2.5 in long, 2 in broad, pubescent. *Peduncles* 1 to 2 in long. *Branch peduncles* short,

pedicels slender, bracteoles linear-subulate or lanceolate, buds globose, flowers very small. *Calyx*-lobes ovate-oblong, 0.5 to 0.75 in long, obtuse, erect. *Corolla* urceolate, tube very short, lobes oblong acute, slightly longer than calyx-lobes, glabrous within except for tufts of hair between the anthers. *Anthers* 0.75 in long, tip acute or bifid, spurs short, straight. *Ovary* villous, style obconic, subannulate at the base, stigma conical. *Follicles* torulose, very slender, 1.5 to 2.5 ft long, smooth, the swellings 1 to 1.5 in apart, pericarp thin, smooth inside, placenta enlarged opposite the seeds. *Seeds* elliptic-lanceolate, 5 in long, the top crowned with a dense tuft of tawny bristles, within which arises the white silky coma 1 to 1.8 in long. *testa* rather thick, ribbed, densely villous, with tawny hairs.

MALACCA *Griffith*, *Mamjay* (K D) 1080, 1086, *Derry* 1096  
JOHORE *Ridley* 11132 SINGAPORE *Ridley* 152, 2722, 3602, 4433,  
4960 6523, ? *Kunstler* 198, *Hullett* 509

#### DOUBTFUL SPECIES

7 *URCEOLA RETICULATA*, King & Gamble, n. sp. A climbing shrub branchlets nearly black, smooth, slightly angled, all parts glabrous except the inflorescence and extreme innovations. *Leaves* elliptic, abruptly caudate acuminate at apex, rounded or slightly cordate at base, shining on the upper surface, often plicate, margin recurved 3.5 to 6 in long, 2 to 3 in broad, midrib strong, prominent beneath, slightly impressed above, main nerves 10 to 12 pairs, impressed above, prominent beneath, at an angle of 70° with the midrib, at first straight, then curved to meet in a conspicuously looped intramarginal nerve, secondary nerves few, short. *reticulations* transverse, very prominent, especially beneath. *petiole* 5 to nearly 1 in long, slender, articulate near the base. *Inflorescence* terminal or axillary, tawny puberulous, trichotomous, very much 5- to 6-pinnately paniculate, reaching 12 in in length and nearly the same in breadth, but in some cases and especially when axillary very much smaller, peduncles and their branches variable in length, but always long, slender, flattened, ultimate cymes, sub umbellately corymbose, bracts leafy, gradually diminishing, bracteoles small, ovate-lanceolate to ovate, buds globose, minute. *Calyx*-tube short, lobes as long as tube, 0.3 in. long, ovate, acute. *Corolla* globose, tube scarcely any, lobes ovate 0.6 in long, glabrous within except for the tufts of hair between the stamens. *Anthers* sagittate, tip flattened, membranous, spurs as long as the upper part, filaments very short. *Ovary* villous, style obconical, stigma conical, bilobed. *Fruit* not known.

MALACCA *Pun Bebas* 122 SINGAPORE *Ridley* 2745, 5628

8 *URCEOLA* ? branches and leaves glabrous bark black when dry



leaves 2 to 2.5 in long by .75 to 1.25 in broad, elliptic- or ovate-lanceolate, obtusely acuminate, narrowed into the petiole, firmly coriaceous, pale brown, shining above, nerves 3 to 4 pairs, very slender, ascending, folioles horizontal, 6 to 8 in long by .25 in broad, slightly curved, cylindric from the base, narrowed at the apex, hard, seeds 3 to 3.5 in long, very slender, narrowed into a filiform process longer than the body, on which the fine pale brown hairs of the coma are placed  
Hook f Fl Br Ind III 659

MALACCA *Maungay* (K D) 1069

We can do nothing to throw any further light on this remarkable plant. The structure of the seeds resembles that of those of *Albizia*, but otherwise the plant is quite unlike that genus.

## 21. PARAMERIA, Benth

Large climbing shrubs. *Leaves* opposite, rarely 3-nately whorled. *Flowers* small, in broad lax terminal or axillary panicles. *Calyx* small, 5-lobed or 5-partite with many glands at the base within. *Corolla* hypocrateriform or sub-urpanulate, tube short, broad at the mouth, naked, lobes 5, oblique, twisted overlapping to the left. *Stamens* inserted at the base of the corolla, included, filaments short, anthers lanceolate sagittate, acute or apiculate, conniving over and adhering to the stigma, cells spurred at the base. *Disk* of 5 connate scales. *Ovary* of 2 distinct carpels, longer than the disk, many ovuled, style short, top obconical, stigma conical, with a minute nearly entire apiculus. *Fruit* of 2 long, slender, distantly torulose, follicular mericarps. *Seeds* linear or oblong, compressed, slightly or not contracted at the apex, crowned with short persistent bristles and a long deciduous coma, testa hairy, albumen scanty, cotyledons oblong, leafy, radicle short or long. — **DISTRIBUTION** India and Malaya, about 4 to 5 species.

Leaves under 6 in long, inflorescence in loose paniculate cymes.

Leaves few (3 to 7 pairs) nerved, inflorescence nearly glabrous, folioles 6 to 12 in long, swellings opposite the seeds short, seeds under .5 in long, pubescent.

1 *P. glandulifera*

Leaves many (8 to 10 pairs) nerved, inflorescence very tawny pubescent, folioles 20 to 24 in long, swellings opposite the seeds elongate, seeds 1 in long, glabrous or slightly pubescent.

2 *P. polyneara*

Leaves over 6 in long, inflorescence in dense paniculate cymes, folioles 11 to 14 in long, swellings opposite the seeds short, seeds .4 in long, glabrous.

3 *P. densiflora*

1. **PARAMERIA GLANDULIFERA**, Benth in Gen Pl II 715 (1876). A large climbing shrub, branchlets stout or slender, brown, smooth. *Leaves* chartaceous, opposite or sometimes 3-nately whorled, elliptic, oblong or obovate, abruptly acuminate at apex, widely cuneate at base,

glabrous and shining on the upper surface, somewhat paler on the lower, glabrous except for tufts in the axils of the main nerves, not always found, margins slightly recurved, 3 to 5 in long, 1.5 to 2 in broad, midrib slender, impressed above, raised beneath, main nerves 5 to 7 pairs, arched upwards to and along the margin, where they anastomose, rather indistinct, as are the secondary nerves and reticulations, petiole short, 1 to 2 in long, stout. *Cyme* panicles terminal or axillary to the upper leaves, trichotomous, glabrous or slightly puberulous, branches spreading, slender, terminal cymules subumbellately corymbose, bracts leafy, bracteoles very small, ovate-acute, buds oblong, clavate, flowers white, fragrant. *Calyx*-lobes ovate, ciliate, puberulous outside 0.5 in long, with minute, inconspicuous, subulate glands at the base inside. *Corolla* campanulate, tube 1.25 in long, puberulous without lobes rather longer than the tube, rotate, twisted to the right, obtuse. *Anthers* very small, apiculate, the spurs long, filaments short, with a broad base. *Ovary* minutely hairy, style obconical. *Follicles* very slender, flexuous, 6 to 12 in long, glabrous, acuminate, diverging at up to 60 and then curving to run parallel to each other, swellings from 7.5 to 1.25 in apart, short, pericarp thin, smooth, placenta enlarged opposite the seeds. *Seeds* oblong, concave on the ventral surface, 4 to 5 in long, ending in a tuft of brown bristles, and a silky coma about 1 in long, testa pubescent, thin, albumen scanty, cotyledons ovate, 1.5 in long, very thin, foliaceous, radicle 1.25 in long, slender, cylindric. Kuntz in Journ As Soc Beng XLVI n 255 and For Fl II 660, Hook f Fl Bt Ind III 660. *Ecdysanthera glandulifera*, A DC. Prodr VIII 443, Wight Ic t 1307 (*E. Griffithii* in text), Miq Fl Ind Bat II 432. *E. barbata*, Miq l c 431. *Echites glandulifera* and *monilifera*, Wall Cat 1659, 1660, G Don Gen Hist Dichl Pl IV 75. *Parsonsia barbata*, Bl Bijl 1042.

PENANG *Curtis* 1142. MALACCA *Griffith*, *Mangay* (K D) 1077, 1093, *Cantley*, *Derry* 920, 943. SINGAPORE *Wallich* 1660, *Lobb* — DISTRIB Burma, Andaman Islands, Java, Borneo (*Haviland* 1993, 2056, &c, *Motley* 776), Philippines, Cambodia.

2. *PARAMERIA POLYNEURA*, Hook f in Fl Bt Ind III 660 (1882). A slender climbing shrub, glabrous except the inflorescence and innovations, branches stout, with dark-brown, rough, lenticellate, horizontally ridged bark, branchlets slender, minutely tawny puberulous. *Leaves* membranous, elliptic or elliptic-oblong or -obovate, abruptly short-acuminate at apex, narrowed and at length rounded at base, dark brown and shining above, paler beneath, and very red brown and reticulate when dry, puncticulate, margins slightly recurved, 3 to 6 in long, 1.25 to 2.5 in broad, midrib prominent on the lower, impressed

on the upper surface, main nerves 8 to 10 pairs, the lowest pair very near the edge, starting at an angle of about  $65^{\circ}$  with the midrib, curving upwards to and along the margin, where they anastomose, raised beneath, as are the numerous secondary nerves and the prominent transverse reticulations, main nerves usually with a tuft of hair in their axils, petiole 1 to 2 in long, articulate near the base *Inflorescence* paniculate, terminal, sessile, trichotomous, 4- to 5-pinnate, tawny-puberulous, usually about 6 in long and 6 to 8 in broad, primary branches 15 to 25 in long, flattened, subsequent branches gradually shorter, pedicels short, 1 in long, slender, cymes corymbose, bracts leafy, bracteoles very minute, ovate buds shortly clavate, flowers white, with a pink throat *Calyx* tube short lobes ovate, acute, ciliate, about 0.4 in long, glandular scales minute, generally subulate *Corolla*-tube campanulate, contracted at the base, 1 in long, glabrous within, sparsely pubescent without lobes ovate-oblique, twisted to the right, rotate in flower, as long as tube *Anthers* very small, with a triangular membranous tip *Disk* faintly 5-lobed *Ovary* villous, style obconical, stigma conoidal *Follicles* slender, straight, 20 to 24 in long, glabrous, acuminate, diverging at  $60^{\circ}$  to  $90^{\circ}$  and then slightly curving to lie parallel, the swellings opposite the seeds elongate, 1 in long and about 2 in apart from centre to centre, pericarp thin, smooth, placenta enlarged opposite the seeds which embrace it *Seeds* fusiform, 1 to 1.25 in long, concave on the ventral surface, ending in a somewhat dilated cup-shaped tip, which bears a silky white coma up to 2 in long, testa thin, minutely pubescent, albumen scanty, cotyledons oblong, 2 in long, radicle cylindric, as long as cotyledons

PI NANG *Curtis* 1455, 3025 PERAK *Wray* 2308, 3459 *Scortechini* 58, 1838, *King's Collector* 3337, 3640, 5687, 7491 MALACCA *Griffith*, *Mangay* (K D) 1078 *Hervey*, *Derry* 1013, 1206, *Goodenough* 1241, *Ridley* 10790 SINGAPORE *Ridley* 2713, 2721, *Cantley* 140 *Hullett* 849 -DISTRIB Tenasserim (*Lobb*), Borneo (*Harland* 1598, 1796, *Fraser* 255), Sumatra (*Forbes* 2951)

3 PARAMFRIA DINNIFLORA, Oliv in Hook Ic Pl t 1520 (1886) A shrub, branchlets stout, about 25 in in diameter, fistular, densely rusty tomentose *Leaves* chartaceous obovate oblong or oblanceolate, abruptly acuminate at apex, cuneate and at last rounded at base, glabrous and shining on the upper surface, sparsely pilose on the lower surface, especially on the nerves margins recurved, 5 to 8 in long, 1.75 to 2.5 in broad, midrib stout, main nerves 6 to 8 pairs, at an angle of about  $30^{\circ}$  with the midrib, at first nearly straight, then curving upwards to anastomose near the margin, impressed above, secondary nerves short, reticulations transverse, distant, not promi-

ment, petiole stout, channelled, about 2 in long. Inflorescence terminal, or axillary to the upper leaves, rusty-pubescent, densely corymbosely paniculate, sessile, reaching 6 in in length, and about 4 to 5 in in breadth, main peduncles 1 to 15 in long, flattened, stout, branches opposite or verticillate, also flattened, as are the minor and much shorter branches, pedicels slender, about 15 in long bracts leafy, bracteoles small, ovate, acute buds broadly clavate. Calyx very small, lobes ovate, acute, pubescent without glabrous within, 0.3 in long, scales 3 to 5 to each lobe, obscure. Corolla funnel shaped tube rather slender, minutely pubescent without 1.5 in long lobes ovate oblique, twisted to the right, glabrous. Anthers apiculate filaments very short. Ovary almost glabrous, style short, obconic, stigma conical. Follicles slender, 11 to 14 in long, nearly at right angles and curved inwards distantly torulose, the spaces 1 to 1.25 in long the swellings ellipsoid 5 in long, interspaces less near the tip pericarp brown, minutely rusty puberulous at first, afterwards glabrescent. Seeds 10 to 12, 4 in long oblong, curved obtuse at the tip glabrous, dark reddish brown, the tip with a tuft of tawny bristles surrounding a white silky coma 1 in long integuments 2 the outer hard.

PRANG on Government Hill Curtis 158 Hullett 159

## 22 POLYANTHERA Hook & Arn

Glabrous climbing shrubs. Leaves opposite, acuminate with distant main nerves. Flowers small, white or pink, in terminal or axillary lax trichotomous paniculate cymes. Calyx small, deeply 5 fid, with few or no glandular scales at the base within. Corolla subcorollate, the throat naked lobes 5 very short, obtuse, overlapping to the right, hardly twisted. Stamens inserted at the base of the corolla tube included, filaments short anthers sagittate, conniving over and adhering to the stigma cells produced at the base in empty spurs. Disk annular. Ovary of 2 distinct cupels, longer than the disk style short, stigma obpyriform ovules many. Fruit of 2 divaricate, terete acuminate follicular mericarps. Seeds few oblong or linear, compressed, little contracted at the apex and crowned by a persistent ring of short hairs and a long deciduous coma albumen scanty cotyledons oblong or ovate, leafy, radicle short.—DISTRIB India, Malaya and Southern China, about 4 or 5 species.

Cymes terminal, branches rather stout, leaves with main nerves very oblique (45°) to the midrib

1 *P. micrantha*

Cymes lateral, branches slender leaves with main nerves at about 60° with the midrib

2 *P. multiflora*

1 *ECDYBANTHERA MICRANTHA*, A DC Prodr VIII 442 (1844)  
 A large climbing shrub, branches slender, pendulous, lenticellate, branchlets brown, terete, lenticellate, innovations sometimes puberulous. *Leaves* membranous, ovate-lanceolate to oblong lanceolate, obtusely acuminate at apex, acute or cuneate at base, glabrous on both surfaces, often reddish-brown when dry, 2 to 7 in long, 1 to 2 in broad, midrib slender, main nerves 3 to 5 pairs, at about  $45^\circ$  with the midrib, curved upwards to and along the margin and prominently connected by the transverse reticulations, often with a small tuft of hairs in the axils beneath, petiole 3 to 5 in long, somewhat twisted. *Cymes* puberulous, trichotomous, reaching about 5 in in length and breadth, main peduncles stout, variable, branch peduncles spreading, 1 to 2 in long, cymes corymbos, many flowered. *Pedicels* slender, short, about 1 in long, bracts linear, caducous. *Bracteoles* very small, ovate-acute, buds ovoid. *Calyx* very small lobes ovate, acute, pubescent, ciliate. *Corolla* urceolate glabrous, very small (0.5 in long) lobes falcate, spreading. *Anthers* obtuse, sometimes with a small apiculus. *Ovary* puberulous, twice as long as the disk. *Follicles* 3 to 4 in long, 7.5 in broad near the base, horizontal, slightly recurved, narrowed from above the base to the point. *Exocarp* fleshy, punctate, endocarp shining, crustaceous. *Seeds* elliptic lanceolate, 7.5 in long, 2.5 in broad, compressed, narrowed above and bearing a ring of short tawny bristles and ending in a white silky coma 1.5 to 2.5 in long, testa rusty pubescent, thin, cotyledons oblong, leafy, about 3 in long, radicle cylindric about 1.5 in long. Hook f Fl Br Ind III 662, Miq Fl Ind Bat II 451. *E. brachiata*, A DC l c 443, Kurz in Journ As Soc Beng XLVI 11 255, and For Fl II 189. Miq l c 452. *Echites ? micrantha* and *brachiata*, Wall Cat 1667, 1668. Gr Don Gen Hist Dichl Pl IV 75.

*PFRAK Scortechni* — *DISTRIB* India (Sikkim, Assam, Khasia Hills and Cachar), Burma

The only specimen available is rather a poor one but we see no reason to doubt its identity. The description of the fruit and seeds is taken from Indian specimens.

2 *ECDYBANTHERA MULTIFLORA*, King & Gamble, n sp. A large climbing shrub. Branchlets pendulous, terete, prominently lenticellate, innovations slightly puberulous. *Leaves* membranous, ovate or ovate-lanceolate, long acuminate often abruptly and obtusely at apex the acumen oblique, attenuate and almost rounded at base, glabrous on both surfaces, margins slightly recurved, 2 to 3 in long, 1 to 1.5 in broad, midrib slender, impressed above, raised beneath, main nerves 4 to 5 pairs, the lowest close to the margin, all at about  $60^\circ$  with the midrib and curving upwards to and along the margin and connected by

the parallel transverse reticulations, often with minute tufts of hair in the axils beneath, petiole .4 to .6 in. long, slender, articulate. *Cymes* lateral, trichotomous, rusty-puberulous. very many-flowered, reaching 6 in. or even more in length and breadth, main peduncles 1 to 2.5 in. long, slender; branches many, slender, gradually lessening, ultimate cymes corymbose, pedicels filiform, .1 to .2 in. long, bracts none or very caducous, bracteoles minute, ovate-acuminate, buds oblong. *Calyx*-lobes ovate acute, with minute glands at the base within, pubescent without. *Corolla* urceolate, .06 in. long, lobes short, very slightly twisted to the left. *Anthers* acuminate, basal spurs rather long. *Fruit* not seen.

PERAK. on Larut Peak at 2000 to 3000 ft, *King's Collector* 2294, 2401.

### 23. CHONEMORPHA, G. Don.

Stout woody climbing shrubs. *Leaves* opposite, broad, with arching pinnate nerves. *Flowers* large, white, in lax terminal and pseudo-axillary, bracteolate, paniculate cymes. *Calyx* tubular, 5-fid or -partite, with a ring of glands at the base inside. *Corolla* hypocrateriform, tube cylindric, but slightly expanded both at base and apex, without scales, lobes 5, broad, overlapping to the right, twisted sharply to the left. *Stamens* 5, included, inserted on the throat of the corolla, filaments very short, broad, villous, anthers sagittate, acuminate, connivent over and adhering to the stigma, their cells shortly spurred at the base. *Disk* thick, annular or cupular, entire or 5-lobed. *Ovary* of 2 distinct carpels, ovules many, style filiform, cleft at the base, stigma conoid or sub-clavate. *Fruit* of 2 long, straight, woody, parallel, triquetrous follicular mericarps. *Seeds* ovoid or oblong, flat, produced in a beak, which is again surmounted by a long silky coma, albumen thin, cotyledons flat thick, oblong, radicle short.—*DISTRIB.* India and Malaya, 2 to 3 species.

CHONEMORPHA MACROPHYLLA, G. Don Gen. Hist. Dichl. Pl. IV 76 (1838). A large climbing shrub with copious milky juice, branches stout, warty; branchlets stout, soft, fistular, pubescent, becoming glabrous in age. *Leaves* coriaceous, broadly elliptic to elliptic-obovate or suborbicular, blunt, notched or shortly abruptly acuminate at apex, rounded or cordate at base; both surfaces glabrous or glabrescent when old, the lower pubescent, hirsute or tomentose when young; margins slightly recurved, 6 to 10 in. long, 3.5 to 6 in. broad, midrib very stout, impressed above, prominently raised beneath, main nerves spreading, 8 to 10 or sometimes 12 pairs, at variable distances and irregular and often branched, prominently raised beneath, secondary nerves many,

joining the irregular transverse reticulations, all much raised beneath, petiole stout, 5 to 15 in. long *Panicles* up to 10 in long and 8 in broad, pubescent, peduncles stout, 3 to 4 in long, branches also stout, angled or flattened, more or less racemose, bracteoles ovate, acute, persistent, pedicels about 3 to 4 in long, usually shorter than the calyces, buds clavate, the tip acute, flowers white *Calyx* tubular, wider than the corolla-tube and less than half its length, the mouth with 5 short rounded or subacute teeth *Corolla* 3 in or more across, tube 75 to 1 in long, villous within in 5 bands between the stamens, lobes spreading, obovate-cuneate *Anthers* 5 in long *Follicles* 12 to 18 in long, straight, boldly 3 angled, the tips incurved, 75 to 1 in broad, pericarp woody *Seeds* about 1 in long, ovate below, narrowed half-way up into a beak and again expanded to receive the coma, which is softly white silky and 25 in long, albumen very thin, cotyledons ovate oblong, thick, 5 in long, radicle cylindric, slender, 25 in long A DC Prodr VIII 430, Wight Ic t 432, Brandis For Fl 328 Kurz in Journ As Soc Beng XLVI n 257, and For Fl II 187, Miq Fl Ind Bat II 444, Hook f Fl Br Ind III 661, Trimen Fl Ceyl III 138, Cooke Bomb Fl II 139, Prain Beng Plants 678 *C. mollis*, Miq lc *Echites macrophylla*, Roxb Fl Ind II 13, Wall Cat 1657 *E. grandis*, Wall Cat 1658, Dalz & Gibs Bomb Fl 147, "*Beluttakaka kôdi*," Rheede Hort Mal IX tt 5, 6

PENANG *Ridley* 3441, *Curtis* 832 PERAK *Wray* 2183, 2685, 3661, *Scortechini* 921 *King's Collector* 3636, 6000, 7304, 10574 MALACCA *Mamyay* (K D) 1074, *Derry* 543 —DISTRIB India, Ceylon, Malay Archipelago

## 24 RHYNCHODIA, Benth

Large climbing shrubs *Leaves* opposite, membranous, broad, pinninerved *Flowers* in lax, broad, axillary or subterminal, paniculate cymes *Calyx* 5 partite or fid, lobes about as long as tube, glandular scales many *Corolla* hypocrateriform, tube enlarged opposite the stamens, contracted at the throat, villous, lobes large, twisted, obliquely obovate or obovate falcate, twisted to the left, overlapping to the right *Stamens* inserted on the middle of the tube, filaments broad, short, anthers sagittate, conniving round and adhering to the stigma cells with narrow incurved spurs *Disk* annular, 5 fid *Ovary* of 2 distinct carpels, longer than the disk, style slender, with an ovate truncate top, stigma columnar *Fruit* of 2 narrow parallel compressed follicular mericarps *Seeds* ovate or oblong, compressed, produced in a slender beak which is crowned by a deciduous coma,

albumen none, cotyledons oblong, radicle short, superior.—DISTRIB One species, from India to China

**RHYNCHODIA WALLICHII**, Benth in Gen Pl II 720 (1876) A large climbing shrub, branches distantly tubercled, branchlets glaucescent, rough, lenticellate, the scars of fallen leaves prominent. *Leaves* membranous, elliptic-ovate or -oblong, cuspidately or caudately acuminate at apex, cuneate sometimes unequally at base or occasionally rounded or even cordate, glabrous and shining above, glabrous or puberulous beneath, 5 to 9 in long, 2 to 4 in broad, midrib slender, raised beneath, main nerves 7 to 10 pairs, starting at an angle of about 50° with the midrib and curving upwards to and along the margin, where they anastomose to form a looped intramarginal nerve, raised beneath as are the few secondary nerves and the rather prominent transverse reticulations, petiole 75 to 1 in long, slender, grooved, with small annule-like stipular glands at the base. *Cymes* lax, axillary or subterminal, dichotomous, puberulous, reaching 5 in long and about 7 in in breadth, peduncles 1 to 3 in long, slender, angled, puberulous or glabrous, branches long, slender, ultimate cymes subumbellate pedicels 3 to 5 in long, bracts oblong lanceolate, ciliate, caducous, bracteoles at the bases of the pedicels, ovate lanceolate, scarious, 1 in long, buds clavate with conical tip, flowers white tinged with pink (*calyx* campanulate, tube 1 to 15 in long, furnished with many broad bifid scales at the base within, lobes linear oblong, ciliate, obtuse, as long as the tube margins reflexed. *Corolla* tube broadly inflated opposite the stamens, 5 angled, 25 in long, villous within, the throat narrowed lobes obovate falcate, about 5 in long, slightly villous on the inner face. *Anthers* 15 in long, spurs very slender. *Follicles* 12 to 18 in long, pendulous. *Seeds* ovate oblong, body 5 in long beak very slender, as long as body, crowned by a white silky coma 15 in long, testa leathery, keeled on one side cotyledons fleshy, flattened, 3 in long, 1 to 15 in broad, radicle thick, cylindric. Hook f Fl Br Ind III 667 *Rhyncospermum Wallichii* and *R ellipticum*, A DC Prodr VIII 431 *Echites rhyncosperma*, Wall Pl As Ru I 43, t 49, Cat 1665 *E elliptica*, Wall Cat 1666 *E verticalis*, Herb Ham *Circocoma Wallichii*, Miq Fl Ind Bat II 445 Kunz in Journ As Soc Beng XLVI n 255, and For Fl II 187

**KEDAH** on Langkawi Island, Curtis 3203 **PERAK** *Scortechnii* 1774, King's Collector 5635, 8790 **DISTRIB** India (Sikkim Himalaya, Assam) Burma, Tonkin

## 25 ANODENDRON, A DC

Large glabrous climbing shrubs. *Leaves* opposite, with distant



nerves *Flowers* in axillary or terminal trichotomous leafy paniculate cymes *Calyx* small, 5-partite, glandular or not within *Corolla* hypocrateriform, the tube cylindric, little dilated opposite the stamens, the mouth contracted, without scales, lobes narrow, overlapping to the right twisted to the left, conical and spirally striate in bud *Stamens* inserted below the middle of the tube filaments very short, anthers sagittate, connivent round and adhering to the stigma the cells shortly spurred at the base *Disk* annular or cupular, entire or undulate *Ovary* of 2 distinct carpels sunk in the disk and attached to it by their backs at the base, many ovuled style very short stigma thick, conical, bi-lobed *Fruit* of 2 divaricate acuminate follicular mericarps *Seeds* few, ovoid or oblong, compressed beaked tipped with a long coma which extends down the upper part of the beak more or less albumen usually copious cotyledons ovate, subcordate, flat, radicle superior — **DISTRIB** India and Malaya about 7 species

Flowers in many branched, many flowered cymes usually 6 in long or more buds under 25 in long, leaves coriaceous more than 1 in long and 15 in broad with prominent nerves —

Main nerves 12 to 15 pairs about 5 in apart corolla lobes villous within and at the throat over 1 in long, follicles with thick pericarp, seeds obovoid beak 25 in long the coma shortly decurrent only

1 *A. paniculatum*

Main nerves 8 to 10 pairs about 75 to 1 in apart corolla lobes nearly glabrous within and at the throat 05 in long follicles with thin pericarp, seeds oblong beak 1 in long the coma decurrent on the upper half

2 *A. Candolleianum*

Flowers in few branched few flowered generally axillary cymes usually under 1 in long, buds at least 5 in long, leaves chartaceous usually under 4 in long and 15 in broad with slender nerves, follicles with thin pericarp the seeds obovoid the beak over 1 in long coma decurrent on the upper half very long

3 *A. pauciflorum*

Flowers in branched corymbose terminal cymes reaching 3 in in length, buds 4 to 5 in long leaves coriaceous under 35 in long and 175 in broad with nerves nearly at right angles to the midrib

4 *A. Wrayi*

Flowers in axillary, paniculate, branched cymes reaching 25 in in length, buds 225 in long leaves coriaceous oblong lanceolate reaching 3 to 55 in long and 1 to 15 in broad with nerves at about 75° with the midrib

5 *A. lineolatum*

1 **ANODENDRON PANICULATUM**, A DC Prodr VIII 444 (1844) A very large climbing shrub with greyish brown bark, branchlets stout, rather fleshy, dark brown, glabrous, terete *Leaves* thinly coriaceous ovate, elliptic or elliptic oblong, shortly and abruptly acuminate at apex,

cuneate and rounded at base, both surfaces glabrous, margins slightly recurved, 4 to 8 in long, 1.5 to 3 in broad, midrib stout, impressed and keeled above, raised beneath, main nerves 12 to 15 pairs, parallel, 4 to 6 in apart along the midrib, starting at an angle of from 60° to 70° with the midrib and arching upwards to and along the margin where they anastomose, secondary nerves few, short, between the main nerves, reticulations transverse, conspicuous only in young leaves when dry, petiole 5 in long, stout, slightly winged. *Cymes* axillary and terminal, repeatedly trichotomously branched, reaching about 10 in in length and 6 in in breadth, glabrous, peduncles slender, angled, 5 to 1 in long, successive branchings similar but shorter, ultimate cymes 3 flowered, bracts similar to the leaves and gradually smaller, bracteoles ovate acute, in pairs at the bases of the upper cyme branches and of the pedicels, which are about .05 to 1 in long, buds conical, striated spirally by the twisted lobes of the corolla, flowers white or pale yellow. *Calyx* lobes ovate, rounded, ciliate, the margins somewhat scarious, .06 in long, scales none or very minute. *Corolla* tube cylindric, dilated opposite the stamens and then contracted at the throat, .06 in long, lobes oblong falcate, villous within and at the throat, 1 to 1.25 in long, twisted sharply to the left. *Anthers* sagittate, acuminate, .04 in long, spurs short. *Disk* cupular, entire, undulate, nearly enclosing the adherent glabrous carpels. *Style* almost none, stigma conical with an annular base. *Follicles* hard, woody, divergent in one line, 3 to 6 in long, 5 to 75 in broad near the base and thence narrowed to the blunt tip. *Seeds* few, obovoid, flattened, 5 to 1 in long, beak .25 in long, slender, slightly broadened at the tip, and bearing a 2 in long white silky spreading coma which extends a short way down the tip, testa dark brown, thin, albumen copious, cotyledons oblong, rounded, 4 in long by .25 in broad, prominently nerved, radicle cylindric, 1.5 to 2 in long. Dalz and Gibb Bomb Fl 147, Kurz in Journ As Soc Beng XLVI n 255, and For Fl II 188, Wight Ic t 1309 (*fruit and seeds only*) Hook f Fl Br Ind III 668, Miq Fl Ind Bat II 454, Trimen Fl Ceyl III 141 Cooke Fl Bomb II 141, Prain Beng Plants 679 *Echites paniculata*, Roxb Fl Ind II 17, Wight Ic t 396 *E. coriacea*, Wall Cat 1586 *E. manubriata* and *E. polyantha*, Wall Cat 1663, 1664 "*Kaka-kodi*," Rheede Hort Mal IX t 8.

JUNKSEYLO (Tongka) at Puket, Curtis 2933 PENANG Curtis 1740 —DISTRIB Western India, Ceylon, Eastern Bengal, Burma, Malay Archipelago, Philippines

2 ANODENDRON CANDOLLEANUM, Wight Ic t 1309 (1850) (*excluding fruit and seeds*) A very large glabrous climbing shrub, branches stout, rather fleshy, somewhat angular, light brown, branch-

lets terete, darker *Leaves* coriaceous, elliptic, abruptly cuspidate acuminate at apex, cuneate or rounded at base, pale beneath, glabrous on both surfaces, margin recurved in old leaves slightly cartilaginous, 5 to 9 in long, 2 to 5 in broad, midrib stout, impressed and keeled on the upper, raised on the lower, surface, main nerves 8 to 10 pairs, the lowest near the margin, the rest parallel, yellowish, very stout and prominent, about 75 to 1 in apart along the midrib in old leaves, raised above, starting at from 75° to 80° with the midrib and curving only near the margin and along it, secondary nerves few, reticulations transverse, not prominent, impressed when dry, petiole 15 to 2 in long, stout, twisted, keeled above *Cymes* terminal and axillary, repeatedly 3 dichotomously branched, reaching about 9 in in length and 4 to 5 in in breadth, peduncles terete, 1 to 15 in long, branch peduncles long, slender, somewhat flattened ultimate cymes in corymbose clusters pedicels 1 to 15 in long bracts leafy, bracteoles ovate, acute, scarious, very small, caducous, in pairs at the nodes and below the pedicels, buds conical, sparsely striate, flowers reddish or reddish brown *Calyx* lobes ovate, somewhat acute the margins scarious, not ciliate, 05 in long, scales 0 *Corolla* tube cylindrical, scarcely dilated, 05 in long lobes oblong falcate glabrous except the slightly puberulous mouth, 05 in long, twisted sharply to the left *Anthers* sagittate, acute, 04 in long, spurs short *Disk* cupular, entire, undulate, nearly enclosing the glabrous carpels *Style* short slender, stigma conical with an annular base *Follicles* slender, straight, 6 to 7 in long 4 in broad at the broadest one third of the length up, long acuminate, slightly turned backwards pericarp chartaceous, smooth *Seeds* oblong, flattened, the margins incurved, about 1 in long, produced in a slender beak of the same length, the upper half of which is furnished with a white silky coma 2 to 25 in long, testa thin, dark brown, albumen copious, cotyledons ovate, acute, 75 in long, 25 in broad, prominently nerved, radicle 2 to 25 in long, cylindric, Hook f Fl Br Ind III 669, Miq Fl Ind Bat II 455 *A. rubescens*, Teysm & Binnend Cat Hort Bogor

PENANG West Hill, Curtis 2258 PERAK King's Collector 5558, 6516, 7900, 8702 MALACCA Capt Wight, Maingay (K D) 1087 —  
DISTRIB Borneo

3 ANODENDRON PAUCIFLORUM, Hook f Fl Br Ind III 669 (1882)  
A climbing shrub, branches smooth glabrous, branchlets terete, dark brown *Leaves* chartaceous, oblong or oblong-lanceolate, obtusely acuminate at apex, cuneately attenuate at base, glabrous on both surfaces, greenish above and reddish-brown beneath when dry, margins thin, pale when dry or cartilaginous 3 to 4 occasionally to 5 in long,

1.25 to 1.5 in broad, midrib slender, main nerves slender, 8 to 10 pairs, at an angle of about  $60^\circ$  with the midrib, slightly curved to and along the margin, reticulations indistinct, petiole stout, 2 to 3 in long, winged by the decurrent edges of the blade. *Cymes* terminal and axillary, much shorter than the leaves (rarely 7.5 to 1 in long), few (3 to 15) flowered peduncles stout, usually 5 in long, branches trichotomous, very short, corymbose, pedicels very short, bracts and bracteoles ovate, crowded, small, buds clavate, tip conical, acute and much striate by the twisted corolla lobes, flowers white or yellowish. *Calyx* lobes ovate, ciliate, 1 in long, scales minute, between the lobes. *Corolla* tube cylindric, dilated below opposite the stamens, gradually attenuate upwards to the narrow throat, 3 in long, lobes linear lanceolate, falcate, glabrous without, slightly pubescent within, much twisted to the left, as long as tube. *Anthers* sagittate, with a hyaline apex, filaments very short, broad. *Disk* cupular, glabrous, undulate. *Stigma* sessile, pyriform. *Follicles* straight, divaricate at about 100 to 120, 4 to 5 in long, 6 to 7 in broad a little above the rounded base then narrowed to the acuminate, slightly incurved tip. *pericarp* thick smooth, dark green. *Seeds* obovoid, 6 in long by 3 in broad, flat, slightly hooked below, narrowed above to a long slender beak of 1 to 1.25 in long, the upper half of which is furnished with a spreading white silky coma. 3 to 3.5 in long. *testa* thin, dark brown. *albumen* rather scanty. *cotyledons* ovate, 4.5 in long by 2 to 2.5 in broad, fleshy. *radicle* cylindric, 2.5 in long.

PENANG *Maintagay* (K.D.) 1101. *Curtis* 663, 1457, on Government Hill at 1000 to 2000 ft. PERAK *Wray* 2105, 2569. *King's collector*, 5587, 5599.

4. *ANODENDRON WRAYI*, King & Gamble, n. sp. A climbing shrub, branches stout, fleshy with fibrous inner bark and grey outer bark studded with minute lenticels. *Leaves* coriaceous, obovate or obovate-oblong, rounded at apex, with a minute glandular apiculus, cuneate at base, both surfaces glabrous, margin cartilaginous, recurved. 2 to 3.5 in long, 1 to 1.75 in broad, midrib very stout, impressed above, main nerves 14 to 16 pairs, parallel, at an angle of  $80^\circ$  or more with the midrib, straight and only slightly curved near the margin, raised above, secondary nerves occasional, reticulations indistinct, petiole 1 to 2 in long, stout, wrinkled. *Cymes* terminal, corymbose, dichotomous, reaching about 3 in long and broad, peduncles about 6 in long, branches as long, pedicels slender, 3 in long, buds clavate, tips conical, striated by the twisted corolla lobes, flowers greenish yellow. *Calyx* lobes ovate, acute, .06 in long, glabrous, with 3 to 4 rounded scales at the base of each. *Corolla* tube cylindric, slightly constricted in the middle above the stamens, .25 in long, glabrous without, densely pubescent within.

lobes ovate, .2 to .25 in. long, rounded, densely tomentose within, twisted to the left. *Stamens* inserted just above the base of the corolla-tube, filaments very short; anthers sagittate; spurs incurved, as long as the pollen-bearing cells. *Disk* cupular, glabrous, undulate. *Ovary* of 2 carpels adherent to the disk; style short, obconoid at top; stigma conoidal. *Fruit* not known.

PERAK: at Gunong Bubu, 5000 ft., Wray 3828, 3836.

5. *ANODENDRON LANCEOLATUM*, King & Gamble, n. sp. A glabrous climbing shrub; branchlets stout, nearly black, longitudinally wrinkled when dry. *Leaves* coriaceous, oblong-lanceolate, tapering to a blunt acumination at apex, narrowly cuneate at base; both surfaces slightly shining, pale brown when dry, margins recurved, broadly crispate, 3.5 to 5.5 in. long, 1 to 1.5 in. broad; midrib stout, channelled above, prominent beneath, main nerves about 15 to 16 pairs, at about 75° with the midrib, straight to join an inconspicuous intramarginal nerve close to the edge, secondary nerves alternate with and similar to the main nerves, branched above, reticulations irregular, petiole .4 to .5 in. broad, channelled above, the edges connivent. *Cymes* axillary, paniculate, nearly half as long as the leaves, reaching 2.5 in. long and about 1.25 in. in diameter, peduncles 1 to 1.5 in. long, flattened, with sometimes a small branch at the base, the next joint of the rachis nearly 5 in. long, side branches short, cymules close; pedicels short, variable, bracteoles ovate, acuminate, small; buds slender, clavate with a conical tip, striated by the twisted corolla-lobes, .225 in. long, flowers pale buff (Wray) *Calyx* shortly campanulate, deeply lobed, lobes ovate, acute, ciliate, .06 in. long. *Corolla-tube* sub-cylindric, dilated below, somewhat constricted above, glabrous except at the base within, .15 in. long, lobes as long as tube, oblong-linear, much twisted. *Stamens* inserted near the base of the tube, anthers sagittate, .06 in. long, tip obtuse or emarginate, empty spurs slender. *Disk* cupular. *Ovary* of 2 carpels, conical, style almost none, stigma conical, acuminate. *Fruit* not known.

PERAK: at Tapa, Wray 1321

## 26. *CLEGHORNIA*, Wight.

Glabrous climbing shrubs. *Leaves* opposite, membranous, acuminate, penninerved, the main nerves straight. *Flowers* small, in axillary or terminal paniced or corymbose cymes. *Calyx* small, 5-partite, with 5 didymous glands alternate with the lobes. *Corolla* hypocrateriform; lobes 5, overlapping to the right, twisted or not to the left. *Stamens* inserted below the middle of the corolla-tube, conniving over and adhering to the stigma; filaments short; anthers sagittate, the cells shortly spurred at the base. *Disk* of 5 scales, cleft at the apex.

*Ovary* of 2 carpels, sunk in the disk, style short, obconical stigma conical, apiculate *Fruit* of 2 long, acuminate, follicular mericarps *Seeds* oblong, narrowed at the ends, tipped with a deciduous coma albumen scanty cotyledons linear, flat, radicle superior—*DISTRIB* Ceylon and Malaya, about 3 species

Leaves elliptic or elliptic oblong, over 1 in broad, cymes paniculate, corolla lobes linear oblong over 1 in long 1 *C. malaccensis*

Leaves lanceolate, cymes corymbose, corolla lobes rounded under 05 in long 2 *C. gracilis*

1 *CLFGHORNIA MALACCENSIS*, King & Gamble A slender climbing shrub branchlets pale brown, terete, often curved in the internodes *Leaves* membranous, elliptic or elliptic oblong abruptly obtusely caudate acuminate at apex, attenuate to almost rounded at base bright green above blueish green beneath nearly white when dry margin recurved, 2 to 4 in long, 1 to 1.5 in broad midrib slender channelled above, raised beneath, main nerves 12 to 14 pairs, slightly impressed above, raised beneath at about 70° to 80° sometimes at right angles to the midrib straight and meeting in an intramarginal looped nerve secondary nerves many, one usually between each pair of main nerves reticulations few inconspicuous petiole 5 to 1 in long twisted *Cymes* terminal, rarely axillary, paniculate reaching 4 in in length and breadth peduncles slender, 75 to 2 in long, flattened branches trichotomous, flattened, variable ultimate cymes subumbellate pedicels 1 to 2 in long bracteoles ovate subulate very small buds oblong clavate flowers waxy white with yellow inside *Calyx* lobes lanceolate, ciliate, 0.75 in long *Corolla* tubular campanulate 2 to 2.5 in long glabrous except for a minute pubescence near the throat within lobes as long as tube, linear oblong margins incurved, slightly twisted to the left *Stamens* inserted a little above the base of the tube, filaments slender anthers sagittate, pubescent on the back, bluntly apiculate the basal spurs long *Disk* of 5 slightly bifid scales *Ovary* scarcely exsert from the disk style slender stigma oblong, conical above and often bifid at tip *Follicles* divaricate at about a right angle, 2.5 to 5 in long, 2.5 in broad, slightly incurved, acuminate, glabrous *Seeds* linear oblong or fusiform, 4 to 5 in long, ending in a flattish point covered with a rather short coma of silky hairs, testa thin, brown *Barriseu malaccensis*, Hook f in Fl Br Ind III 663

PERAK *Scortechium* 40, Wray 3457, King's Collector 5900, 8798, 10799 MALACCA *Maringay* (K D) 1094

2 *CLEGHORNIA GRACILIS*, King & Gamble, n sp A slender climbing shrub, the stem reaching 1 to 2 in in diam, branchlets very slender

dark brown, often curved in the internodes *Leaves* membranous, lanceolate, long but obtusely caudate-acuminate at apex, cuneate at base, bright green above, paler beneath, margins cartilaginous, 2 to 3 in long, 5 to 7 in broad, midrib slender, main nerves 12 to 16 pairs, at about 70° to 80° with the midrib, straight, meeting in an intramarginal looped nerve, secondary nerves frequent, usually one between each pair of main nerves, reticulations indistinct, petiole slender, 25 in long *Cymes* axillary and terminal, slender, corymbose, reaching 2 in in length and breadth, peduncles very slender, 5 to 75 in long, branches trichotomous, capillary, pedicels 2 in long, bracteoles very minute, subulate, buds clavate, flowers light yellow *Calyx*-lobes orbicular, 0.4 in in diam, scales very small or none *Corolla* urceolate, 1 in long, tube minutely white puberulous within, lobes rounded, not twisted, 0.4 in long *Disk* faintly 5 lobed *Anthers* blunt or slightly emarginate at the tip, with a slender hair like apiculus *Fruit* not seen

PERAK on Cawfield's hill, 4000 ft *Scortechini* 384, at 3000 to 4000 ft, clinging to trees, *King's Collector* 6351, *Wray* 3209

The following Bornean species may eventually be found in the Malay Peninsula —

*CILICHOZIA BORNEENSIS*, King & Gamble, n sp. A climbing shrub branchlets purplish brown when dry angled smooth glabrous *Leaves* elliptic or elliptic obovate abruptly cuspidate acuminate at apex rounded at base, both surfaces glabrous, the lower pale 4 to 5 in long 2 to 2.5 in broad, midrib slender raised and sharp beneath, main nerves 10 to 12 pairs parallel, starting at about 70° with the midrib and curving gently upwards to and along the margin, secondary nerves few, chiefly between the upper main nerves reticulations slender oblique more or less parallel, both main nerves and reticulations raised on both surfaces petiole 2 in long bordered above by the crispate decurrent margins of the blade *Flowers* in axillary and pseudo terminal glabrous corymbose cymes, reaching 6 in long and 3 in broad, peduncles slender, 5.1 to 2.5 in long, primary branches 3 chotomous, rest 2 chotomous, pedicels slender variable about 1 to 2 in long, bracteoles small, ovate in pairs at the axils and usually 2 in the middle of each pedicel, buds linear oblong, flowers yellow *Calyx* campanulate lobes ovate acute, thin, 1 in long with small scales alternate with them within at the base *Corolla* tube cylindric very slightly dilated at the base, slightly funnel shaped towards the naked mouth 3 in long, lobes ovate rounded, only very slightly twisted to the left, 1.5 in long the tube and mouth slightly villous within *Stamens* inserted at the very base of the tube, anthers sagittate, the spurs slender, filaments very short, thick *Disk* 5 lobed, enclosing the glabrous nearly globose carpels, style thick, obconic, stigma conical apiculate *Fruit* not known

BORNEO near Kuching *Haviland* and *Hore* 2169

27 ICHNOCARPUS B.

Climbing shrubs with opposite leaves. *Flowers* small, in lax, many flowered, terminal and axillary, paniculate cymes. *Calyx* 5 fid, glandular or not within. *Corolla* hypocrateriform, the throat contracted or villous lobes narrowed to an obtuse point, overlapping to the right the upper half of each lobe deflexed in bud. *Stamens* inserted at or below the middle of the corolla tube filaments very short anthers sigillate conniving over and adhering to the stigma cells spurred at the base. *Disk* free, 5 lobed. *Ovary* of 2 distinct carpels exserted from the disk hairy ovules many style short top obconic stigma columnar. *Fruit* of 2 slender, spreading or divaricate, follicular mericarps. *Seeds* oblong, narrowed at the tip, ending in a deciduous coma albumen copious cotyledons long flat radicle short superior.—DISTRIB India Malaya Australia species 5 or 6

Leaves usually elliptic acute under 1.5 in broad, inflorescence narrowly paniculate very rusty tomentose under 3 in long, corolla tube globose opposite the stamens contracted above, disk lobes capitate.

1 *I. frutescens*

Leaves usually ovate obtuse or acute over 1.5 in broad inflorescence rather broadly paniculate 3 to 5 in long rachis glabrescent corolla tube campanulate opposite the stamens, not contracted above, disk lobes not capitate.

2 *I. natifolia*

1 ICHNOCARPUS FRUTESCENS Ait Hort Kew ed 2 II 69 (1811)  
A much branched and extensively climbing shrub branchlets slender twiny pubescent innovations fulvous tomentose. *Leaves* very variable chartaceous elliptic elliptic oblong or elliptic lanceolate or lanceolate acute or acuminate sometimes mucronate at apex, cuneate or slightly rounded-attenuate at base glabrous on the upper surface, pale and softly red tomentose or glabrescent beneath, 2 to 4.5 in long, .75 to 1.5 in broad midrib slender, impressed above main nerves 5 to 7 pairs curved upwards to and along the margin, reticulations in a fine network conspicuous in young leaves, petiole 1 to 3 in long, reddish tomentose. *Cymes* paniculate 1 to 3 in long, terminal and axillary, often forming an elongated leafy thyrus at the ends of the branchlets, rusty pubescent or tomentose, peduncles short, branches trichotomous, pedicels stout or slender, 1 to 2 in long, often 3 together, bracts leafy, caducous, bracteoles ovate, acute, very small, buds clavate, tip conical flowers greenish or yellowish white. *Calyx* lobes ovate acute or lanceolate .05 to 1 in long, glands none. *Corolla* tube .1 in long, cylindrical at base, dilated and nearly globose opposite the stamens and then again constricted pubescent without where dilated, glabrous within, mouth with slightly thickened folds and villous, lobes 1.5 to 2 in



long, linear falcate, with a twisted sparsely hirsute tip, white-hirsute within. *Stamens* very small, anthers 0.5 in long, with small spurs. *Disk* with 5 linear capitate lobes. *Ovary* of 2 villous carpels, style slender, 0.5 in long, stigma globose, with a conical tip. *Follicles* very slender, cylindrical, 3 to 6 in long, 1 to 1.5 in broad, curved, rusty-pubescent at first, afterwards glabrous, pericarp thin. *Seeds* linear-cylindric, 4 to 7.5 in long, very slender, deeply grooved, scarcely beaked, tipped with a scanty white coma 1 in long, testa thin, dark brown, cotyledons linear, very thin, 3 to 4 in long, very narrow, radicle barely 0.5 in long. A DC Prodr VIII 315, Benth Fl Austral IV 315, Wight Ic t 430, Wall Cat 1674, Brandis For Fl 327, Dalz & Gibs Bomb Fl 147, Kurz in Journ As Soc Beng XLVI n 256, and For Fl II 186, Hook f Fl Br Ind III 669, Miq Fl Ind Bat II 448 and Suppl 556, Trimen Fl Ceyl III 142, Cooke Fl Bomb II 142, Plain Beng Plants 680. *I. radicans*, Wall Cat 1676. *I. dasycalyx*, Miq l c 449. *Echites frutescens*, Wall Cat 1674, Roxb Fl Ind II 12.

PERAK *Scortechini* 2199. *Kings Collector* 820, 7049, 10986. — **DISTRIB** India, Ceylon, Burma, Sumatra, Java, Australia (Queensland).

2. *ICHNOCARPUS OVATIFOLIUS*, A DC Prodr VIII 435 (1844). A climbing shrub, branchlets blackish brown, terete, innovations slightly rusty-pubescent. *Leaves* variable, chartaceous, orbicular, ovate or elliptic, obtuse, acute or cuspidate at apex, rounded or attenuate or cuncate at base, glabrous on the upper surface, glabrous and paler on the lower or the midrib, villous margins slightly recurved, 3 to 6 in long, 1.5 to 3 in broad, midrib slender, impressed above, main nerves 5 to 6 pairs, curved upwards to and along the margin, secondary nerves few, reticulations elegantly netted, conspicuous on the under surface of young leaves, scarcely visible in old ones, impressed above as are the main nerves, petiole slender, usually pubescent, 4 to 6 in long. *Inflorescence* paniculate, up to 5 in long, terminal and axillary, often forming an elongated, broad, leafy thyrus at the ends of the branchlets, the rachises rusty pubescent or glabrescent, the cymules densely pubescent, peduncles variable, branches trichotomous, pedicels stout, 0.5 to 1 in long, bracts leafy or at the uppermost nodes, bracteoles very many, broadly ovate, acute, at the bases of the pedicels, buds obovate, tip rounded, flowers white. *Calyx* campanulate, tube 0.5 in long, lobes ovate-acute or -acuminate, 0.6 in long, glands none. *Corolla* tube 1 in long, pubescent, cylindric below, then dilated opposite the stamens, mouth not contracted, but thickened in a fold within, lobes 1.5 in long, linear falcate, villous within, especially at the tips, much twisted. *Stamens* very small, anthers 0.4 in long, with small spurs, tip

acute *Disk* with 5 linear-subulate, not capitate, lobes *Ovary* of 2 villous carpels, style slender, 0.3 in long stigma globose, with a long conical tip *Follicles* cylindric, divaricate, densely rusty pubescent Hook f Fl Br Ind III 670, Miq Fl Ind Bat II 449 *I affinis*, Herb Ind Or Hook f & Th *I latifolius*, Herb Ham in Wall Cat 1652 *Echites affinis*, Room & Sch Syst IV 393 *Sprinqia indica*, Muell & Van Heurck in Plant Nov Van Heurck 143

PENANG *Curtis* 810, 3082 PROVINCE WELFELF *Ridley* 9392 PERAK *Scortechini Kunzler* 181, *King's Collector* 10531 MALACCA *Griffith Mainyay* (K D) 1075, 1103 PAHANG *Ridley* 2179 SI LANGOR *Ridley* —DISTRIB India (Sylhet and Khasia Hills), Sumatra, Borneo Celebes, Timor, Philippines

## 28 AGANOSMA G Don

Stout evergreen climbing shrubs *Leaves* opposite *Flowers* in many flowered, terminal or axillary, tomentose or puberulous cymes large or medium sized often sweet scented usually white *Calyx* 5 partite to the base or nearly so lobes lanceolate more or less gland bearing at the base within *Corolla* hypocrateriform, lower part of the tube cylindric, upper campanulate or cylindric broader than the lower bearing villous longitudinal bands behind the anthers lobes broad or narrow overlapping to the right twisted more or less to the left *Stamens* inserted on the base of the upper part of the corolla tube filaments very short, anthers sagittate conniving over and adherent to the stigma the cells spurred at the base, upper half only pollen bearing *Disk* cupular or cylindric 5 lobed *Ovary* of 2 distinct carpels included in or somewhat exsert from the disk, usually hirsute, many ovuled style short top urn shaped, stigma columnar, conical at tip *Fruit* of 2 terete straight or curved follicular mericarps *Seeds* oblong obovate or linear obovate, flattened, not beaked tipped with a deciduous silky coma testa thin albumen scanty cotyledons oblong radicle short superior —DISTRIB India and Malaya about 6 species

*Calyx* glands many, opposite the lobes, which are 2.5 in long, ovary half exsert from the disk, corolla lobes narrow linear, leaves with a prominent intramarginal nerve

1 4 *marginata*

*Calyx* glands under 5, alternate with the lobes, which are 7.5 to 1 in long, ovary included in the disk corolla lobes broad rhomboid, leaves without a prominent intramarginal nerve

2 *A calycina*

### 1 AGANOSMA MARGINATA, G Don Gen Hist Diehl Pl IV 77 (1838)

A stout scandent or subscandent shrub, branches stout, prominently dotted with raised warts, branchlets slender, brown, lenticellate innovations glabrous or rusty-pubescent, nodes, both of branches and

branchlets, with prominent ridges *Leaves* membranous, oblong-lanceolate or elliptic-oblong, acuminate at apex often abruptly, rounded at base, glabrous above, glabrous or pubescent beneath, 2 to 5 in long, 75 to 15 in broad, midrib slender, channelled above, raised beneath, main nerves 12 to 16 pairs at an angle of about  $60^\circ$  with the midrib, slightly arching to meet in a prominent intramarginal looped nerve, the lowest 1 or 2 pairs occasionally free, raised beneath, secondary nerves also prominent, usually one between each pair of main nerves, reticulations netted petiole 15 to 25 in long, slender *Cymes* terminal or more often axillary, di-tri-chotomous, puberulous, variable in size but reaching to about 4 in in length and 3 in in breadth, peduncles about 1 to 2 in long branches gradually shorter, ultimate cymes corymbose pedicels 15 in long, bracts caducous bracteoles linear subulate, 25 in long, buds cylindrical, slender, flowers white *Calyx*-tube almost none, lobes lanceolate acuminate, 25 in long, glabrous or pubescent, nerved, with many small subulate glands at the base within, especially on the inner lobes *Corolla* tube cylindric above, enlarged at the base below the stamens and sometimes slightly constricted near the mouth, which is thickened, 25 in long, glabrous except for 5 villous bands behind the anthers within, lobes narrow, linear, acute, 5 to 7 in long *Stamens* inserted a little above the base of the tube anthers lanceolate-acuminate, 15 in long, filaments very short *Ovary* of 2 obtuse carpels, glabrous, half sunk in the disk, style slender, annulate at top, stigma conoidal *Follicles* pendulous, slender, slightly divergent, 52 to 15 ft long, 3 to 4 in broad, glabrous, dark brown, speckled, at first joined at the tip *Seeds* linear-oblong, 3 in long, crowned with a silky coma 15 in long albumen very scanty Wight Ic t 425, A DC Prodr VIII 433, Kurz in Journ As Soc Beng XLVI n 256, and For Fl II 186, Hook f Fl Br Ind III 663, Prain Beng Plants 679 *A. acuminata*, G Don l c , Wight Ic t 424, A DC l c 434, Miq Fl Ind Bat II 447 *A. macrocarpa*, A DC l c 434 Miq l c *Echites marginata*, Roxb Fl Ind II 15, Wall Cat 1661 *E. acuminata*, Roxb l c *E. macrocarpa*, Wall Cat 1662 *E. reticulata*, Boj Hort Maui 211 *E. apocys*, Voigt Hort Sub Cylc 522 ? *E. cristata* Roth Nov Pl 135 ? *Chonemorpha cristata* G Don l c 76

TRANG Curtis 3393 *King's Collector* 1426 KEDAH on Langkawi Island, Curtis 2792 PENANG Curtis 664 PERAK *Scortechini* 6, 7, 68, *King's Collector* 7321 MALACCA *Giffith Mungay* (K D) 1076, 1000 to 1002 PAHANG *Ridley* in Trans Linn Soc, Ser 2, III 3219 SINGAPORE *Murton* 74 — DISTRICT India (Sylhet and Chittagong), Burma, Java, Sumatra, Philippine Islands

2. *AGANOSMA CALYCINA*, A. DC. Prodr. VIII. 432 (1844). An immense (Scortechini) climbing shrub; branchlets stout, as thick as a goosequill, ferruginous-puberulous, nodes faintly ringed. *Leaves* coriaceous-chartaceous; elliptic or elliptic-oblong or elliptic-ovate, shortly and abruptly acuminate at the rounded apex, attenuately rounded at base; glabrous on both sides except for a few sparse hairs beneath; margins recurved, 3.5 to 6 in. long, 1.5 to 3.5 in. broad; midrib stout, impressed above, raised beneath; main nerves 7 to 10 pairs, starting at an angle of about  $80^{\circ}$  to  $85^{\circ}$  with the midrib and curving upwards to and along the margin, secondary nerves few, inconspicuous, reticulations minutely netted, impressed and prominent beneath, petiole .5 in. long, articulate (cymes terminal, sessile, dichotomous, rusty-puberulous, corymbosely flattened, reaching to 5 in. in length and 8 in breadth, main peduncles 1 to 3 in. long, somewhat flattened, stout, branches similar but shorter and thinner, pedicels .5 to .75 in. long, bracts leafy, ovate-acuminate, caducous, bracteoles lanceolate, similar to calyx-lobes, buds conical, flowers large, white, handsome. *Calyx*-lobes lanceolate acuminate, .75 to 1 in. long, fulvous-tomentose, the inner 3 broadly keeled on the back, scales minute, subulate, 3 to 5 at the base within and between the lobes. *Corolla*-tube cylindric, rather stout, lower part narrowed, upper part broad and then slightly narrowed upwards, 4 to .5 in. long, 5-sulcate, pubescent without, ferruginous-villous within in bands behind the stamens, lobes rhomboid, broad, half glabrous, half tomentose, as long as tube, twisted to the left. *Stamens* inserted on the broadest part of the tube within, filaments very short, densely villous, anthers sagittate, very slender, 3 in. long, basal spurs somewhat rounded, connective pubescent. *Disk* glabrous, conical, 5-furrowed and -lobed, 15 in. long, enclosing the ovary. *Ovary* of 2 carpels, glabrous below, long-villous above, style slender, enlarged upwards and dilated into a villous lobed cup, stigma conical, elongate. *Fruit* not seen. Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186, Hook. f. Fl. Br. Ind. III. 664. *A. Roxburghii*, G. Don Ex. Wight Ic. t. 440. *A. Wallichii*, G. Don Gen. Hist. Diehl Pl. IV. 77. *Echites calycina*, Wall. Cat. 1653. *E. caryophyllata*, Roxb. Fl. Ind. II. 11.

PERAK. Scortechini 16, from Gunong Chabary, King's Collector 10808.—DISTRIB. Tavoy.

## 29. TRACHELOSPERMUM, Lœmbaire.

Climbing shrubs. *Leaves* opposite, penninerved. *Flowers* white or purplish, in lax terminal or pseudo-axillary cymes. *Calyx* small, 5-partite, with 5 to 10 small scales or glands at the base within. *Corolla* hypocrateriform, the tube cylindric, dilated opposite the stamens, con-

stricted at the mouth and sometimes almost closed with the folds; lobes 5, oblique, twisted to the left, overlapping to the right. *Stamens* inserted above the middle of the tube, included or the apices shortly exsert, filaments very short, broad, anthers sagittate, shortly acuminate, connivent around the stigma and adhering to it; the cells produced below in sharp spurs. *Disk* annular, truncate or 5-lobed. *Ovary* of 2 carpels, longer than the disk, style filiform; stigma columnar, base shortly ringed, tip conical; ovules very numerous. *Fruit* of 2 elongate incurved follicular mericarps. *Seeds* linear, not beaked, crowned at the apex with a long dense coma; albumen copious, cotyledons linear, flat; radicle short, superior.—*DISTRIB.* India, Malaya and Eastern Asia as far as Japan, about 8 species.

*TRACHELOSPERMUM CURTISII*, King & Gamble, n. sp. A climbing shrub, branchlets terete, slender, uppermost with innovations and inflorescence tawny-villous, nodes with a prominent pubescent ridge. *Leaves* membranous, elliptic or elliptic-ovate, abruptly acuminate at apex, auriculate cordate at base; strigosely hispid on both surfaces especially on the nerves, finally glabrous, 3 to 5 in. long, 2 to 3 in. broad, midrib slender, impressed and keeled in old leaves; main nerves 8 to 10 pairs, the lowest pair small deflexed, the rest at about 50° to 60° with the midrib, curved upwards to meet in an inconspicuous looped intramarginal nerve, and joined by the prominent transverse reticulations, petiole .3 to .5 in. long, tawny-villous. *Cymes* terminal, sessile, corymbose, tawny-villous, up to 6 in. long and 8 in. in diam.; main branches 3 to 5, cymules congested, pedicels short, 1 to .2 in long, bracts leafy, caducous, bracteoles linear-subulate, densely tawny-villous at the joints and the bases of the pedicels, buds clavate, apex conoidal, flowers white, very sweet-scented. *Calyx*-lobes linear-lanceolate, slightly villous without, .1 in. long, longer than the tube, with small subulate scales at the base between the lobes. *Corolla*-tube narrowed below, then dilated opposite the stamens, then gradually narrowed to the constricted mouth, .5 to 6 in. long in all, glabrous within, lobes obliquely triangular-spathulate, dentate at apex, .4 to .5 in. long, twisted to the left, glabrous. *Stamens* inserted at or a little below the middle of the tube; filaments stout, short, rugose, decurrent below; anthers sagittate, membranously apiculate, spurs as long as or longer than the pollen-bearing cells, slender, incurved below. *Disk* annular, 5-lobed, fleshy, lobes slightly emarginate. *Ovary* of 2 carpels, villous above, rounded; style slender, gradually enlarged; stigma columnar, obscurely angled, with a short spreading ring below and conical point. *Follicles* 8 to 9 in. long, .25 in. broad, somewhat flattened, divergent at about right angles and curved inwards to an acute tip; pericarp scabrous-puberulous,

dark brown with a reddish tinge. *Seeds* oblong, 7 to 8 in long, 2 in broad, acute at base, slightly narrowed above and then broadening below the 1 to 1.5 in long white-silky persistent coma; testa thin, dark brown, albumen moderate, cotyledons lanceolate, 5 to 6 in long, 1 in broad, radicle short.

PENANG at Bahak Pulau, *Curtis* 838. PERAK *King's Collector* 5194.

We have been a good deal in doubt of the genus of this species, in the Kew Herbarium it was placed with *Chonemorpha*, but the comparatively small flowers and different seeds distinguish it from that genus, in some respects it comes most nearly to *Erigynum*, but on the whole we prefer to keep it where we first placed it in *Trachelospermum*, to which genus it seems to us to come most near, especially in the characters of the inflorescence and the fruit. There is in the Kew Herbarium a species (unnamed) which approaches very near to this. It has been sent from the Khasia Hills (*Hook f and Th*), from Manipur (*Watt 7272*), and from Yunnan (*Hemsl 12136*). When it comes to be described with full material it is by no means unlikely that the two will be found to require a new genus.

### 30 ERIGYNUM, Wight

Climbing shrubs. *Leaves* opposite, penninerved, the nerves arching. *Flowers* canescent-tomentose, in dense subcapitate corymbose or paniculate leafy cymes at the ends of the branches. *Calyx* small, 5 fid the lobes narrow, oglandular or with few glands. *Corolla* hypocynteriform, the tube elongate, dilated opposite the stamens, the throat villous, without scales. lobes 5, twisted to the left or nearly erect, overlapping to the right. *Stamens* inserted below the middle of the tube, included filaments short. *Anthers* linear-sagittate, acuminate, connivent around the stigma and hardly adhering to it, cells spurred at the base. *Disk* fleshy 5 lobed, lining the calyx tube. *Ovary* of 2 distinct carpels, dorsally adnate to the disk and surmounted by it, style filiform, stigma cylindric, with annular base and conical tip, ovules many in each carpel. *Fruit* of two linear terete distinct follicular mericarps sometimes torulose. *Seeds* elongate compressed, broad at the tip and crowned with a thick coma of silky hairs, testa very thin albumen moderate or scanty cotyledons oblong, narrow, foliaceous. radicle short, superior. — DISTRIBUTION Malay Peninsula and Archipelago about 4 to 5 species.

*Leaves* elliptic, main nerves 6 to 7 pairs, straight at first. —

Leaves glabrous beneath except for tufts in the nerve axils, corolla tube grey-tomentose without .. 1 *L. perakense*

Leaves tomentose beneath, not tufted in the nerve axils, corolla tube tawny tomentose without .. 2 1 *Mangayi*

*Leaves* lanceolate, main nerves 7 to 8 pairs, curved, corolla tube greyish tawny tomentose. —

Leaves prominently tawny villous in the nerve axils and along the midrib beneath, otherwise glabrous, flower buds under 75 in long, corolla lobes rounded at tip .. 3 1 *Curtisi*

Leaves not tufted in the nerve axils, sparsely strigose beneath, flower buds over 1 in long, corolla-lobes squared at tip

.. 4 1 Ridley

1 *EPIGYNUM PERAKENSE*, King & Gamble, n sp A large climbing shrub, branchlets slender, reddish brown, terete, uppermost and innovations minutely puberulous nodes ringed *Leaves* membranous, elliptic or elliptic-oblong, acute or shortly acuminate at apex, acute-cuneate rhomboid or almost rounded at base, glabrous on both surfaces except for tufts of hair in the axils of the main nerves beneath, margins slightly recurved, 2 to 4 in long, 1.5 to 2.5 in broad, midrib slender, pale, raised beneath main nerves 6 to 7 pairs, prominently raised beneath and pale, at from 50° to 70° with the midrib, nearly straight, meeting in a widely looped intramarginal nerve, secondary nerves few, reticulations irregular, scanty, prominent, petiole .25 to .5 in long, twisted, articulate *Cymes* terminal or axillary, crowded, grey tomentose, trichotomous, up to about 1.5 to 2 in long and broad peduncles none or short, branch peduncles short, pedicels about .15 in long, bracts leafy, caducous, bracteoles many, usually 2 to 3 to each pedicel, ovate acuminate, similar to the calyx-lobes, buds clavate, twisted, .5 to .75 in long, flowers white *Calyx* small, lobes ovate acuminate, .075 in long, with minute scales at the base *Corolla* tube cylindric, dilated below opposite the stamens, 6 to 7 in long, grey-tomentose without, slightly villous within, throat with tufts of hair between the lobes, lobes .25 in long, oblong, crenulate, rounded, twisted to the left, glabrous within, glabrous on the upper, tomentose on the lower half without *Stamens* inserted a little above the base of the tube filaments short slender, anthers sagittate-acuminate with long spurs, 15 to 175 in long *Disk* annular, 5 lobed, glabrous *Ovary* of 2 glabrous carpels attached by their backs to the disk and within it, style slender, stigma cylindric, with a spreading ring below and conical tip *Follicles* 10 to 12 in long, densely brown-tomentose when young, tawny-puberulous when old, divaricate at about a right angle, toulose, the swellings opposite the seeds nearly .25 in in diam, between them about 1 in, pericarp chartaceous, thin *Seeds* slender, fusiform, 1 in long, flattened, gradually broadening upwards to an oblique tip, and furnished with a 1 in long white silky coma, testa thin, scabrous, cotyledons narrowly linear-oblong, .25 in long, radicle very small, .05 in long

PERAK Wray 1802, 1946, 2365, 4267, *Scortechini* 1474, King's Collector 1971, 2324

This species comes near to *E. Griffithianum* Wt but has rather different more acuminate leaves with pale nerves when dry and larger flowers not so villous within

2 *EPIGYNUM MAINGAYI*, Hook f in Fl Br Ind III. 666 (1882) A climbing shrub branchlets slender with terigenous tomentum *Leaves* membranous, elliptic, acute both at apex and at base, glabrous or minutely puberulous on the upper, yellowish-brown-tomentose on the lower surface margin slightly recurved, 3.5 to 4.5 in long, 1.5 to 2.5 in broad, midrib stout, prominently raised beneath, main nerves 6 to 7 pairs, at about 60 with the midrib, at first nearly straight, then slightly curving to join an intramarginal looped nerve, secondary nerves few, inconspicuous as are the rather distant reticulations, petiole 2.5 in long, tawny-tomentose *Cymes* terminal or axillary, trichotomous, tawny tomentose reaching about 3 in in length and 2 in in breadth peduncles 1 to 1.5 in long, main branch peduncles .5 to .75 in long, cymes paniculate, pedicels 2 to 3 in long, stout, bracts leafy deciduous, bractlets ovate-acuminate, .075 to .1 in long, 3 to each pedicel buds clavate, whitish brown-tomentose, .5 to .75 in long, flowers white *Calyx* small, lobes ovate acuminate, 1 in long each with about 3 subulate pubescent scales at the base within *Corolla* tube cylindric, tawny tomentose, slightly dilated below opposite the stamens, gradually enlarged above, with 5 villous longitudinal lines within, 6 to 7 in long throat with tufts of hair between the lobes, lobes oblong, crenulate, rounded, twisted to the left, glabrous within, glabrous on one half and tomentose on the other half without *Stamens* inserted a little above the base of the tube filaments slender anthers very narrowly sagittate, long acuminate above and with spurs as long below, .175 in long in all *Disk* annular, faintly undulate on the margin, glabrous *Ovary* of 2 glabrous carpels attached to the disk at their backs and within it style slender stigma slender, cylindric, 1 in long, with a spreading ring below and conical point above *Follicles* 6 to 8 in long 1.5 to 2.5 in broad, slender, cylindric, flexuous, rusty-tomentose *Seeds* fusiform pubescent compressed 6 to 7 in long, obliquely truncate at top and crowned with a coma of white silky hairs

PERAK in open bamboo forests, 400 to 600 ft, *King's Collector* 8734 MALACCA *Mumgay* (K D) 1088 SINGAPORE at Kuala Lumpur *Ridley*

3 *EPIGYNUM CURTISII* King & Gamble, n sp A climbing shrub, branchlets slender, terete, uppermost and innovations puberulous *Leaves* membranous, lanceolate, acuminate at apex, attenuate and finally rounded at base, glabrous above, glabrous beneath except along the midrib and for the large hairy tufts in the axils of the main nerves margins slightly recurved, 3.5 to 4.5 in long, 1 to 1.5 in broad, midrib slender, raised beneath main nerves 7 to 8 pairs at an angle of 60



with the midrib, curving upwards and branching to form an obscure intramarginal looped nerve, secondary nerves not conspicuous, reticulations irregular, prominent beneath, petiole 25 in long. *Cymes* terminal and axillary, pubescent, paniculate, few- (20 to 25-) flowered, reaching 3 to 3.5 in long and about 1.5 in broad, peduncles none or short, as are the branches, pedicels 15 to 2 in long, bracts leafy, persistent, bracteoles ovate-acute, small, 1 to 2 at the base of each pedicel, buds elongate-clavate, 5 to 7.5 in long, flowers white. *Calyx* tube 0.5 in long, lobes ovate acuminate, reflexed, with 1 or 2 small scales at base within. *Corolla*-tube cylindric, slightly dilated below opposite the stamens, greyish tawny tomentose without and with pubescent lines within, 6 in long, throat with a villous ring, lobes obovate, 3 in long, twisted slightly to left in flower, more so in bud, glabrous within, glabrous without on upper, pubescent on lower half which is exposed in bud. *Stamens* inserted a little above the base of the tube, filaments slender, anthers narrowly sagittate, long acuminate, 1.75 in long, spurs long and slender. *Disk* annular, shortly lobed. *Ovary* of 2 glabrous carpels attached by their backs to the disk and within it, style slender, stigma conical, 0.75 in long, with a spreading ring below. *Fruit* not seen.

PERANG on the road to Penang Bukit, at 2000 ft., *Curtis* 2441

4. *EPIGYNUM RIDLEYI*, King & Gamble, n. sp. A slender climber branchlets brown, terete, uppermost parts tawny pubescent, nodes slightly raised. *Leaves* chartaceous, lanceolate or elliptic lanceolate acuminate at apex, attenuate at base, glabrous on the upper surface, sparsely strigosely hirsute on the lower, especially on the nerves. margin slightly recurved. 2 to 4 in long, 1 to 1.5 in broad, midrib slender but prominent, main nerves 8 to 10 pairs, at an angle of about 60° with the midrib, nearly straight to meet a looped intramarginal nerve, secondary nerves irregular, reticulations few, transverse. petiole slender, 2.5 to 5 in long, pubescent, channelled above. *Cymes* terminal, densely rusty villous, the branches sessile or pedunculate, few-flowered (7 to 8), trichotomous, bracts leafy, the lowest similar to the leaves, the succeeding ones smaller by degrees. bracteoles minute, ovate acute, on the short (2 to 3 in long) pedicels. buds very slender with narrowly conical tips, 1.5 to 1.75 in long, densely pubescent, flowers white. *Calyx* tube short, lobes ovate, acuminate, villous without, glabrous within, 1.5 in long, scales none or very minute. *Corolla* tube very slender, enlarged below opposite the stamens, gradually widening above, 1 to 1.5 in long, rusty-villous without, also in vertical lines within, otherwise glabrous, lobes rhomboid, crenate, glabrous except the lower part outside which is exposed in bud, 2.5 to 3 in long, twisted slightly

to the left *Stamens* inserted a little above the base of the tube, filaments 15 in. long, flattened, puberulous, anthers sagittate, 25 in long, with a membranous tip and long basal spurs. *Disk* 5-lobed, lobes sparsely long hirsute. *Ovary* of 2 glabrous carpels within the disk, style slender, stigma long cylindric, with a spreading fimbriate ring below and conical tip. *Fruit* not known

PERAK at Rawang, Ridley 7567.

The following species is here described as likely to be eventually found in the Peninsula —

*EPIGYNUM FORBESII*, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, uppermost minutely puberulous. *Leaves* chartaceous; elliptic or elliptic-oblong, acute or shortly acuminate at apex, cuneate at base; glabrous or with scattered hairs above, glabrous beneath; 3.5 to 5.5 in. long, 1 to 2.5 in. broad: midrib slender, prominent beneath; main nerves 8 to 10 pairs, arching upwards to and along the margin and meeting in an intramarginal looped nerve, raised beneath, secondary nerves many; reticulations distant, irregular; petiole 2 to 4 in long, twisted. *Cymes* terminal and axillary, about 20-flowered, congested, tawny-tomentose, sessile or very shortly peduncled, bracts leafy, bracteoles small, ovate-acuminate, 2 to 3 at the bases of the 1 in long pedicels; buds clavate with large conical heads, flowers white. *Calyx* lobes ovate acuminate, 1 to 1.5 in long, eglandular. *Corolla*-tube slender, cylindric, dilated below opposite the stamens, often twisted, 1 in long, lobes spatulate, crenulate, glabrous except the part exposed in the bud, twisted to the left, 6 in long. *Stamens* inserted a little above the base, filaments short, slender, anthers narrowly sagittate, acuminate. *Disk* glabrous, 5-lobed. *Ovary* of 2 glabrous carpels adnate to the disk, style slender, stigma cylindric, with a spreading ring below and conical tip. *Fruit* not seen.

SUMATRA near Bijan Telok, 500 ft., Forbes 3236. Haviland's No 5018 from Kuching, Borneo, resembles this very closely, but has the leaves more lanceolate and longer acuminate.

### 31. MICRECHITES, Miq

Large climbing shrubs with pubescent inflorescence, otherwise glabrous. *Leaves* opposite, penninerved. *Flowers* small, in axillary and terminal dichotomous thyrsoid or brachiate panicle cymes. *Calyx* small, deeply 5-fid or 5-partite, with obtuse lobes, many-glandular within. *Corolla* subhypocrateriform, the tube ovoid-campanulate, naked at the mouth, lobes 5 falcate, very oblique, sometimes forked, the upper half deflexed in bud, overlapping to the right. *Stamens* inserted near the bottom of the tube, included, filaments short, anthers sagittate, conniving round and adhering to the stigma, cells produced at the base into empty spurs. *Disk* annular or cupular, entire or 5-lobed. *Ovary* of 2 distinct carpels, longer than the disk, style short, stigma ovoid or oblong, with a short obtuse apiculus, ovules very many. *Fruit* of 2 divaricate, thick, subterete, follicular mericarps. *Seeds* generally few, linear-oblong, compressed, not beaked, with a terminal persistent coma,

albumen scanty, cotyledons narrowly linear, elongate, radicle very short —DISTRIB India and Malaya, about 4 species

Leaves almost coriaceous broad, inflorescence many branched  
many flowered, corolla lobes short, often forked, reflexed .. 1 *M. polyantha*

Leaves chartaceous, narrow, inflorescence scarcely branched,  
very few flowered, corolla lobes long, not forked, spreading .. 2. *M. elliptica*  
var *Scortechnii*

1 *MICRECHITES POLYANTHA*, Miq Fl Ind Bat II 457 (1856) A slender climbing shrub, branches obscurely angled, branchlets dark brown, terete, innovations sparsely pubescent. Leaves chartaceo-coriaceous, elliptic-obovate elliptic oblong or oblong-lanceolate, obtuse or obtusely acuminate at apex, cuneate attenuate or sometimes slightly rounded at base, glabrous on both surfaces, 2 to 4.5 in long, 1 to 2 in broad midrib stout, prominent beneath, main nerves 10 to 15 pairs, slender, at an angle of 60 to 70 with the midrib, nearly straight to join in an obscure intramarginal nerve, secondary nerves many, similar to and between but more slender than the main nerves, reticulations very oblique, petiole .5 to 1 in long, channelled above, often twisted. Cymes terminal and axillary, thyrsoid, rusty-tomentose, much branched, at length often elongating in slender bracteolate racemes, reaching 5 to 7 in in length and 3 in in breadth, rachises angular or flattened peduncle 0 to 2 in long, pedicels very short and stout, .05 to 1 in long, bracts lanceolate, caducous, bracteoles very many, persistent, ovate, acute or obtuse, conspicuous especially after the fall of the flowers, buds ovoid or conical flowers white. Calyx campanulate, lobes ovate, rounded, rusty tomentose without, glabrous within, .05 to .15 in long the base inside furnished with minute scales mixed with villous hairs. Corolla campanulate or urceolate, .15 to .2 in long, contracted at the mouth, glabrous without, puberulous within lobes falcately lanceolate with a knee at the base, or bilobed, the divisions unequal, much reflexed, pubescent at the mouth, .05 to .125 in long. Anthers acuminate. Ovary densely villous. Pollinifer terete, cylindric, 6 to 12 in long, divergent at about 120 and curving upwards so as nearly or quite to meet again, acuminate at tip, pericarp thin, dark brown, glabrous. Seeds linear oblong, narrow, compressed, 1 to 1.5 in long, somewhat enlarged at the apex and furnished with a thick, close, persistent, tawny coma .2 in long, testa thin, dark brown, albumen scanty, cotyledons linear, very slender, 1 in long, radicle minute. Hook f Fl Br Ind III 671 *Tabernaemontana polyantha*, Blume Bijl 1029, A DC, Prodr VIII 376

PINANG Curtis 850, Ridley 9426 PLRAK Ridley 2896, Wray 1815, 2604, King's Collector 4430, 5875, 6564, 6840, 8404, 8859, 10003

SELANGOR *Ridley* 7412 MALACCA *Mungray* (K D) 1081 — DISTRIB. Andaman Islands, Java.

Some of the specimens examined differ in the size of the flowers, in the inflorescence, and in the greater or less bifurcation of the corolla lobes, but we have not succeeded in separating any of them as species or even varieties, and prefer to consider them all as forms of one.

2 *MICRILCHITES ELLIPTICA*, Hook f Fl Br Ind III 671 (1882)  
*Rhynchospermum* 4, Herb Ind Or Hook f & Th

India in Sikkim Himalaya at 4000 to 6000 ft., and Khasia Hills at 3000 to 4000 ft

VAR *Scortichinii*, King & Gamble A climbing shrub. Leaves chartaceous lanceolate, obtusely long-acuminate at apex, cuneate at base glabrous on both surfaces, 3 to 3.5 in long, 1 to 1.5 in broad, main nerves 10 to 12, very slender, not conspicuous, secondary nerves many, reticulation, oblique petiole .25 in long Cymes terminal or axillary, very few flowered, scarcely reaching 1 to 1.5 in long, minutely pubescent, pedicels slender, .2 in long bracteoles ovate, persistent, buds ovoid, obtuse. Calyx lobes ovate, ciliate, rounded, .075 in long Corolla tube cylindric, 1 in long, constricted slightly at the mouth, lobes linear-oblong, 1.5 in long, twisted, glabrous, much turned to the left. Anthers sagittate, acuminate, filaments very short Ovary densely villous Fruit not known

PEKAL *Scortichinii*

This may prove when better specimens are available to be incapable of separation from the Indian type.

## FAMILY LXXVI ASCLEPIADACEÆ

Herbs or shrubs, erect or more usually twining, often with a tuberous rootstock or fleshy roots juice milky or watery, stems simple or branched, usually woody, sometimes succulent. Leaves opposite or whorled, sometimes wanting, very rarely alternate, thin or fleshy, quite entire sometimes with an interpetiolar stipular line or teeth. Flowers hermaphrodite, very variable in size and form but always regular, solitary or few or many together, in umbels, umbel-like cymes, fascicles or racemes, axillary, lateral between the bases of the leaves or terminal. Calyx inferior, of 5 sepals or 5-lobed, lobes imbricate, usually with minute glandular scales at the base within. Corolla hypogynous, gamopetalous, regular, 5-lobed, various in shape, tube usually short (long in *Ceropegia*), sometimes furnished within or at its mouth with variously shaped processes forming a corolline corona, lobes imbricate, contorted or valvate in aestivation, often recurved, sometimes more or less erect and connate at their tips. Stamens 5, inserted at or near the base of the corolla and alternate with its lobes, rarely higher up, filaments some

times free, more usually connate in a tube around the ovary, forming with the anthers and their terminal appendages a *staminal column*, with the apex often united to the dilated part of the style, usually with more or less fleshy processes on the back forming a *staminal corona*, anthers free or united to the dilated part of the style, 2-celled, the cells dehiscing by apical longitudinal or transverse slits, the margins of the anthers or their basal prolongations below the cells more or less horny and wing like (the *anther wings*), usually projecting outwards, the adjacent wings of each pair of anthers nearly meeting and forming between them very narrow fissures leading to the stigmatic cavities, connectives of the anthers often produced into membranous rarely fleshy or inflated terminal appendages which are sometimes connate pollen contents of each anther cell granular or united into one or two waxy masses (*pollen masses*) formed of an indefinite number of pollen grains and attached in pairs or in fours, sometimes directly but more usually by means of arm like *caudicles* to each of the 5 small, usually horny turgid or bilobed *pollen carriers*, which rest one on each of the 5 angles of the dilated part of the style the whole forming the *pollinia* the masses attached to each pollen-carrier always being derived from the cells of two different but adjacent anthers, when granular, each granule is formed of about 4 pollen grains united together, and, on the dehiscence of the anthers, the whole is loosely contained in the horny spoon, trumpet, or funnel like or bifid *appendicle* tapering downwards into a short or long *caudicle* attached to a soft (adhesive?) pollen carrier gland *Ovary* superior, of 2 one celled, many ovuled carpels free below the styles united above and dilated into a pentagonal disk (*style apex*) which is flat or depressed in the centre with or without a conical or otherwise shaped tip, and bears on its angles the pollen carriers and immediately beneath them, behind the fissures between the anther wings, the 5 stigmatic cavities, ovules usually numerous, rarely few or solitary, anatropous pendulous, imbricate in several series on the projecting placenta *Plat* of 2 (or 1 by suppression) divaricate or parallel foliaceous menispermous dehiscing by the ventral suture and usually liberating the placenta, pericarp usually smooth, sometimes echinate or winged *Seeds* usually flat, sometimes ovoid or cylindric, usually with a broad or narrow margin, generally crowned with a *coma* of long silky hairs, sometimes fringed, sometimes without any tuft, testa thin or thick, albumen usually thin, sometimes rather thick, sometimes none, embryo large, nearly or quite filling the seed, cotyledons flat, radicle usually cylindric, superior — **DISTRIB** A large Family of more than 1800 species, widely distributed over tropical and subtropical, with a few in temperate, regions

As in the Family *ATOCINACEÆ*, in which we were much assisted by Dr O Stapf's account of it in the 'Flora of Tropical Africa,' Vol IV Sect 1, so in *ASCLEPIADACEÆ* we have been indebted to that by Mr N E Brown in the same work, which has helped us properly to understand the morphology of a very difficult but most interesting Family of plants. We wish also to mention that much assistance was derived from the account of the Family and its Western India genera given by Dr T Cooke, CIL in Vol II of his 'Flora of the Presidency of Bombay'

ANALYSIS OF THE TRIBES

Pollen granular, loosely contained in the more or less spatulate or bifid appendices, not attached to the latter	I PHYLLOCLAD
Pollen united into very minute waxy masses 1 or 2 of which are sessile upon a very minute quadrate pale coloured pollen carrier	II SECOMONIA
Pollen united in waxy opaque masses without pellucid margin usually of fair size and attached in pairs by caudicles to the dark coloured pollen carriers —	
Pollen masses pendulous	III CYNANCHI
Pollen masses erect or horizontal, very rarely pendulous	IV MARSIPPI
Pollen united in waxy masses pellucid on one margin or at the apex, and attached in pairs by caudicles to the pollen carriers	V CEROPEGLIA

Tribe I PHYLLOCLAD

Filaments of the stamens free, anthers acute or with the connectives produced in terminal appendages connivent over the style apex and frequently connate. Pollen-contents of each anther-cell of numerous loose granules, each granule formed of 3 to 4 pollen-grains united in lines or tetrads. Appendices spatulate, trumpet-shaped or trowel shaped, sometimes bipartite, horny, attached by short or long caudicles to an adhesive pollen-carrier gland at the base, which is itself attached to the angles of the style apex, holding the pollen-granules loosely but not attached to them.

Corona processes none —

Anthers with long appendages, clubbed —

    Anther appendages erect, thick curving inwards at tip . . . 1 PHYLLOCLAD

    Anther appendages erect bearded, erect at tip . . . 2 PENIANIA

Anthers with short appendages curving over the style apex, shrubs . . . 3 GONGYLOPERMA

Corona processes 5 —

Corona processes short, thick . . . 4 HERMIDESMUS

Corona processes filiform, behind the stamens —

    Stamens without alternating glands between the filaments, corolla lobes rounded

        Follicles short, broad, ribbed, corolla large . . . 5 PENTASTEMONIA

        Follicles cylindric, narrow, not ribbed, corolla small . . . 6 GYMANTHIA

    Stamens with glands between the filaments —

        Corolla lobes elongate, linear lanceolate, anther appendages long, narrow . . . 7 ATHIRANDIA

        Corolla lobes short, ovate, anther appendages short, thick . . . 8 SIBERIAULON

## 1 PHYLLANTHERA, Blume

Glabrous climbing shrubs *Leaves* opposite, with nerves at right angles to the midrib, pale beneath *Flowers* long-pedicelled, subracemose, reddish, in lax pedunculate cymes from one axil of a pair of leaves *Calyx* short, 5-fid, lobes ovate, scales 5, alternate with the lobes within, membranous. *Corolla* campanulate rotate, fleshy, deeply 5-fid, papillose within, lobes suboblique, concave, overlapping to the right *Corona* none *Stamens* affixed near the base of the corolla, filaments free, anthers agglutinated with the style apex, not bearded, appendages erect, thick, naked, curving inwards at the tip *Pollen* granular, composed of 3 to 4 granules cross wise adherent, pollen-carriers globose, bearing short slender caudicles ending in obliquely funnel shaped appendices which carry the pollen-masses *Style apex* capitate, obscurely 5 angled *Fruit* of 2 slender divaricate follicular mericarps *Seeds* oblong, testa thin, with few silky hairs ending in a tufted long silky coma albumen thin cotyledons oblong, radicle cylindric, nearly as long as the cotyledons — *DISTRIB* Species 2, one of the Malay Peninsula, the other of Java

PHYLLANTHERA PLAKENSIS, King & Gamble, n sp. A glabrous slender climbing shrub, with thin slender terete branchlets *Leaves* somewhat fleshy membranous when dry, oblong or oblong lanceolate, acuminate at apex, rounded at base, glabrous on both surfaces, the lower pale, almost glaucous, margins recurved 2.5 to 4 in long, .75 to 1.25 in broad, midrib prominent, impressed above, raised beneath, main nerves 8 to 10 pairs at right angles to the midrib, obscure, slender, straight to join an intramarginal looped nerve at the sinus of the loops, secondary nerves very few, between and parallel to the main nerves, very obscure, reticulations not visible, petiole slender, .25 to .5 in long, slightly thickened below *Cymes* few flowered peduncles slender, up to about .25 in long, branches usually 2, reaching .5 in in length, subracemose, with pairs of persistent small ovate acute scarious bracts, pedicels very slender, about .25 in long, buds globose, flowers reddish brown or mottled red and yellow *Calyx* lobes ovate, hyaline, .05 in long, scales 1 to 2 in long, membranous *Corolla* lobes orbicular, imbricate 2 to 3 in long, minutely papillose within, tube very short *Anthers* with appendages .05 to .075 in long *Follicles* slender, 6 to 7 in long, .25 in broad, the tip hooked inwards, divaricate in one straight line, pericarp smooth, thin, dark brown, striate *Seeds* many, oblong, ridged on the ventral surface, .3 in long, .06 in broad, with a few sparse white hairs and a deciduous silky white spreading coma 1.5 to 2 in long, testa thin, dark brown, albumen very thin, cotyledons oblong, rather fleshy, .15 in long, .05 in broad, radicle cylindric, .1 in long

PERAK at Kota, Wray 2407, 3005, *Scortechini*, at Larut, King's collector 2059, 2181, 7314

This species comes very near to the Javanese *P. binda* Blume but the latter has narrower and longer leaves, with very many (20 to 25) pairs of main nerves and many secondary ones with the intramarginal nerve much nearer the margin. The peduncles and branches of the cyme and the pedicels are stouter and longer and the corolla more fleshy. The anthers are similar, but the pollen carrier appendices are more obliquely funnel shaped (see t. xxii in Bl. Mus. Bot. Lugd. Bat. I). The only specimen in the Kew Herbarium is 'Coll. L. Lobb, India 1868,' and may be possibly from the Peninsula. In the Calcutta Herbarium are specimens from Sumatra (*H. O. Forbes* 2436).

## 2. PENTANURA, Blume

Glabrous climbing shrubs. *Leaves* opposite, with nerves at right angles to the midrib or nearly so. *Flowers* 1 to 3, on bracteate pedunculate racemose cymes in the axils of or opposite to one leaf of the panicle. *Calyx* small, 5 fid, with 5 membranous scales alternate with the lobes within. *Corolla* campanulate-rotate fleshy, deeply 5 fid, papillose within. Lobes oblong, concave, overlapping to the right. *Corona* none. *Stamens* affixed near the base of the corolla, the bases distant, geniculate, filaments free, anthers agglutinated with the style-apex, oblong, not bearded, appendages lanceolate, bearded, caudiform, erect at tip. *Pollen* granular, composed of 3 to 4 granules cross-wise adherent. *Pollen carriers* discoid, bearing slender caudicles and spatulate often truncate appendices which carry the pollen-masses. *Style-apex* capitate, sharply 5 angled. *Fruit* of 2 slender divaricate locular mericarps. *Seeds* oblong, with few silky hairs ending in a tufted long silky coma. *Testa* thin. *Albumen* thin, cotyledons oblong, radicle cylindric.—*DISTRIBUTION* Species 2, one of the Khasia Hills and Yunnan, the other of the Malay Peninsula and Archipelago.

This genus comes very near to *Phyllanthera*, with which we are inclined to think it might be incorporated. It differs in the markedly pentagonal style apex, the bearded anther appendages, and the spatulate not funnel shaped appendices of the pollen carrier. *P. khasiana*, Kurz Fl. B. Ind. IV 4, hardly seems to us to belong to this genus.

PENTANURA SUMATRANA, Blume Mus. Bot. Lugd. Bat. I 125, t. xxi (1849). A glabrous slender climbing shrub, with thin angled or striate branchlets, bearing occasional round lenticels. *Leaves* chartaceous elliptic, rather abruptly acuminate at apex, cupreate at base, glabrous on both surfaces, the lower pale, almost glaucous. The margins strongly recurved. 3 to 4 in long, 1.25 to 1.75 in broad. Midrib slender slightly impressed above, raised beneath, main nerves 7 to 8 pairs, slightly raised beneath, at or a little less than right angles with



the midrib, straight to join an intramarginal looped nerve, secondary nerves few, very faint, reticulations not visible, petiole 25 in long, channelled above, sometimes bearing small stipular glands at the base. *Racemes* up to 2 in long, 1- to 3-flowered, with pairs of persistent ovate scarious bracts, pedicels slender, 15 in long, buds ovoid, acute, flowers deep red. *Calyx* lobes ovate, acute, hyaline, .1 in long, with ovate acute membranous scales .03 in long between each at the base within. *Corolla*-lobes oblong or obovate oblong, 5 in long by 3 in broad, minutely papillose within, tube salver shaped at base. *Appendages* of stamens erect, bearded, about .03 in long. *appendices* of pollen-carriers as long. *Follicles* slender, 5 to 6 in long, 2 in broad, very acute, divaricate in a straight line, tips straight, pericarp thin, rough, striate, dark brown. *Seeds* many, oblong, ridged on the ventral surface, .275 in long .075 in broad, with a few sparse white curly hairs and a deciduous silky white spreading coma about 1.5 in long, testa thin dark brown. *albumen* thin, cotyledons oblong 15 in long by .05 in broad, radicle cylindric, 1 in long. *Miq Fl Ind Bat II* 471. *Engl & Prantl Naturl Pflanzenfam IV* 2, 211, fig 63, D E.

*PERAK* at Belan Tujoi *Wray* 1847 4025. *Scortechini* 1303. *King's Collector* 1825, 3514. — *DISTRIB* Sumatra (*Praetorius, Beccari* 640).

### 3 GONGYLOSPERMA King & Gamble, nov. gen.

A shrub. *Leaves* opposite strongly nerved. *Flowers* in axillary or pseudo terminal, bracteate paniculate cymes. the branches 2 to 3 photomous. pedicels slender. *Calyx* short, 5 partite. scales combined in a ring. *Corolla* rotate campanulate, the tube short. lobes oblong, overlapping to the right. *Corona* none. *Stamens* inserted on the corolla tube. filaments free, broad and nearly confluent at base. anthers short, appendages short, triangular incurved over the style apex, pollen granules elongate, of 3 to 4 pollen grains in one line, pollen carriers minute, appendices spatulate. *Ovary* of 2 carpels. styles distinct below, combined above. style-apex obscurely 5 angled, flattened at top. *Fruit* of 2 short divaricate oblong follicular mericarps. pericarp thin, pubescent. *Seeds* very small, oblong-cylindric, with a white silky coma, albumen copious, cotyledons fleshy, radicle cylindric. — *DISTRIB* A single species only as so far known.

*GONGYLOSPERMA CURTISII*, King & Gamble, n. sp. A small shrub, branches smooth, brown. *Leaves* coriaceous lanceolate or oblong lanceolate, acute at apex, attenuate at base, both surfaces rugose, the upper slightly puberulous, the lower pubescent, both ashy grey, the lower much the paler. margins recurved. 2.5 to 4.5 in long, .75 to 1.75

in broad, midrib as well as all nerves and reticulations impressed above, raised beneath, midrib thick, main nerves stout, 18 to 20 pairs, at about 60° with the midrib, nearly straight to join an obscure intra-marginal looped nerve close to the margin, secondary nerves few, reticulations closely netted, petiole rather stout, 15 to 25 in long (yuncs more or less grey-puberulous, reaching 15 in long and 2 in broad, peduncle stout, 25 to 5 in long, branches 3-chotomous, secondary branches again 3-chotomous, both furnished with pairs of small ovate acute bracts, pedicels slender, 15 in long, buds ovoid, acute. *Calyx* short, tube very short, lobes ovate, acute, hyaline on the margins, glandular dotted, scaling narrow. *Corolla* tube short, lobes oblong blunt, 15 in long. *Corona* none. *Stamens* few, filaments rather thick, enlarged and almost confluent at the base, anthers short, rounded, appendages triangular, black, curved over the style apex and connate. *Style* short, stout, style apex obscurely 5-angled, flattened at top. *Follicles* straight, thick, 1 to 1.25 in long, 25 in broad, divaricate in a straight line tip slightly incurved, blunt. pericarp thin, minutely grey pubescent. *Seeds* oblong cylindric, 1 in long and .05 in thick, ending in a sparse white silky coma 2 in long. testa granular, very thin, albumen copious, cotyledons elliptic, fleshy, .06 in long, radicle cylindric, a little shorter than the cotyledons.

SIAM STATES at Poongth, in the crevices of limestone rocks (1915 2951)

#### 1. HINDUS, B.

Twining shrubs. *Leaves* opposite or in whorls of 4. *Flowers* small, greenish purple, in opposite crowded subsessile cymes. *Calyx* 5-partite, lobes acuminate, with 5 minute scales between them at their bases within. *Corolla* rotate, deeply 5-fid, with valvate fleshy lobes, tube very short. *Corona* processes 5, short, thick, on the throat of the corolla and alternate with its lobes. *Stamens* inserted at the base of the corolla tube, filaments distinct or subconnate at the base, anthers small, cohering at the apex terminated by inflexed appendages, pollen masses cohering in pairs in each cell, granular, the caudicles of the pollen-carriers thick below, then slender, bearing cucullate or spreading appendices. *Style*-apex 5-lobed, flat on the top. *Fruit* of 2 slender divaricate terete follicular mericarps. *Seeds* oblong, flattened, ridged on the ventral face, ending in a broad tip bearing a long silky coma. albumen scanty. cotyledons oblong, fleshy, radicle cylindric.

DISTRIB India and Malaya, species 1 or 2

**HEMIDESMUS INDICUS**, Br. in Mem Wern Soc. Edinb. J. 57 (1811). A prostrate or twining shrub, with slender terete branchlets, older branches dark brown, with prominent wart-like lenticels. *Leaves* chartaceous, very variable, in pairs or whorls of 4, of which one pair shorter than the other, elliptic-oblong to linear-lanceolate, acute or mucronate at apex, rounded at base; glabrous on both surfaces, the upper sometimes variegated with white, the lower often pale, margins recurved, 2 to 4 in. long, .5 to .75 in. broad (our specimen), midrib slender, raised beneath or flattened, main nerves 4 to 5 pairs, curving upwards and meeting near the margin, reticulations obscure; petiole .15 to .25 in. long, slender. *Cymes* opposite, on very short peduncles, flowers on short pedicels with many ovate-acute bracts. *Calyx*-lobes ovate-acute, membranous, .05 in. long, scales minute. *Corolla*-lobes ovate-oblong, acute, tips incurved, 15 to 25 in. long. *Corona*-scales often emarginate. *Follicles* cylindric, 4 to 7 in. long, spreading at 180° apart or slightly curved backwards from the straight line, tips slightly hooked, pericarp thin, smooth. *Seeds* ovate-oblong, flattened, ridged on the ventral face, testa granulate on one side and the margin, smooth on the other, cotyledons oblong, radicle slightly shorter than cotyledons. Wall Cat 8243, Wight Contrib 63, Ic t 591, Deless Ic Sel V t 55, Dene in DC Prodr VIII 494, Miq Fl Ind Bat II 465, Benth & Thunb Med Pl t 174, Hook f Fl Br Ind IV 5, Thunb Fl Ceyl III 144, Cooke Fl Bomb II 147, Plain Beng Plants 686, Engl & Prantl Naturl Pflanzenfam IV 2, 218, fig 63, n 1. *H Wallchii*, Miq Pl Hohenack No 359. *Periploca indica*, Willd Sp Pl I 1251. *Islepras pseudo sarsa*, Roxb Hort Beng 20, and Fl Ind II 39, *exl syn*. Burm Thes Zeyl t 83, fig 1. "*Naru nandi*," Rhoebe Hort Mal X t. 34.

**DINDINGS** at Bruas Road, *Curtis* - **DISTRIB** India, Ceylon

The only specimen available was a very poor one with only one or two nearly rotten flowers, but there seems no reason to doubt its identification.

##### 5. **FINLAYSONIA**, Wall

A lofty glabrous climbing shrub with milky juice. *Leaves* opposite. *Flowers* in 2- to 3-chotomous axillary cymes, moderate-sized, yellowish and purple. *Calyx* short, 5-partite. *Corolla* rotate, deeply 5-fid, the lobes broad, ovate, overlapping to the right. *Corona*-processes 5, filiform, close behind the stamens. *Stamens* inserted at the throat of the corolla, filaments slender, anthers adnate to the style-apex by the middle, ending in broad inflexed membranous acute appendages, pollen-masses cohering in pairs in each cell, pollen granular, pollen-

carriers glandular, attached to the angles of the style; pex appendicles slender, dilated above in a small rounded apex. Style slender, style apex large, fleshy, truncate and 5 angled at base convexly conical above. Fruit of 1 or 2 divaricate, fleshy, broad, follicular mericarps the sides with 1 to 4 longitudinal ribs, the tip incurved. Seeds lax, flattened, ovate, with shortulous hairs at the margins, coma none. Testa thin, albumen scanty, cotyledons broadly oblong, fleshy, radicle short, stout. DISTRIB. India and Malaya. 1 species.

*FINLAYSONIA OBOVATA*, Wall Pl. As. Rai II 48, t 162 (1831) and Cat 4466A. A lofty glabrous climbing shrub with milky juice, branches stout, obtusely angular, with pale brown papery, lenticellate bark. Leaves coriaceous, obovate, obtuse or shortly apiculate at apex, cuneate at base, both surfaces glabrous, the lower glaucescent, margins slightly recurved, 3 to 5 in long, 1.5 to 2.5 in broad, midrib broad, slightly impressed above, flattened beneath, main nerves 7 to 9 pairs, at about 70° with the midrib, straight to join in an obscure looped intramarginal nerve, secondary nerves few, reticulations many, indistinct. Petiole .5 to 1 in long. Cymes 2 to 3 in long, peduncle thick, often reddish, .75 to 1 in long, branches divaricate, .25 to .5 in long, usually 3 subsequent branches usually 2, short, stout, pedicels slender, .15 in long, bracts ovate, acute, sheathing the bases of the branches, buds ovoid, flowers yellowish with purple markings. Calyx lobes ovate, acute, ciliate, .05 in long, scales very minute. Corolla lobes nearly orbicular, spreading, furnished within with long whitish hair on a pair only, glabrous without, 2 to 3 in long. Corona processes flexuose, .06 in long. Follicles thick, ventricose, about 3 in long by 2 in broad, broadest in the middle, tip thick, blunt, hooked, ribs 3 to 4 slightly winged, pericarp thin. Seeds ovate, 7 to 8 in long by 4 in broad, flat, the margins winged and bordered by a few long, reddish, appressed hairs, extending in a short tuft at the tip. Testa thin, brown, beaked on the ventral surface, albumen thin, cotyledons oblong, fleshy, .15 in long, .25 in broad, veined, radicle thick, .15 in long. Wight Contrib 65. Wight III t 182, fig 5. Griff. Notul IV 70, and Ic Pl. Asiat t 407. Dene in DC Prodr VIII 494. Miq Fl. Ind. Bat II 464. Hook f 11 Bi. Ind IV 7. Kurz For Fl II 197. Planch. Beng. Plants 686, Engl. & Prantl. Naturl. Pflanzenfam IV 2 211, fig 64, c d. *Gynna obovata*, Hum in Voigt Hort. Sub. Calce 544.

SIAMESI STATES at Kasoom, Curtis 3246. PENANG at Butterworth, Curtis 483. PERAK *Scortechini* 1104. SELANGOR among mangroves at Kuala Selangor, Ridley 7565. MALACCA *Manray* (K.D.) 1104. SINGAPORE *Ridley*. DISTRIB. India (Sundarbans), Burma (*Giffith Helfer* 3749). A plant of the river deltas.

The description of Wallich is most detailed, and, it may be mentioned here, gives a brief account of Mr George Finlayson, in whose honour the genus was named

## 6 GYMANTHERA, Bl

Glabrous climbing shrubs *Leaves* opposite *Flowers* in short axillary peduncled cymes, usually 2-branched, branches racemose pedicels slender *Calyx* short, 5-partite, with 5 or 10 or more minute membranous scales within at the base *Corolla* hypocrateriform or rotate, the lobes spreading, overlapping to the right *Corona*-processes 5, filiform on a broad base, often bifid, affixed to the corolla tube closely behind the stamens and subconnate with them *Stamens* inserted in the tube of the corolla, filaments short, slender above, dilated at the base and subconnate, anthers adherent to the style-apex, produced above in acuminate connivent appendages, pollen granular, in several masses in each anther-cell, the granules elongate, of 3 to 4 grains lineally arranged, pollen carriers large, glandular, caudicles slender, appendices spatulate, carriers attached to the style-apex *Style* short, style-apex convex, 5 lobed at base *Fruit* of 2 cylindric divaricate follicular mericarps *Seed* not known — *DISTRIB* About 5 species of the Malay Archipelago and tropical Australia

*GYMANTHERA INSULARUM*, King & Gamble, n sp A climbing shrub, branches woody, thick, rough, with dark brown smooth bark and occasional lenticels *Leaves* chartaceous, elliptic or elliptic-oblong, rounded with a short acumen at apex, attenuate at base, upper surface dark brown when dry, lower greyish white, both surfaces glabrous, margins slightly recurved, 2.5 to 3.5 in long, 1 to 1.5 in broad, midrib prominent, pale, impressed above, raised beneath, main nerves 12 to 14 pairs, at about 70° with the midrib, slightly curved upwards to join a faint intramarginal looped nerve, secondary nerves faint, short, reticulations netted, impressed above when dry, petiole slender, 5 to 7.5 in long, channelled above *Cymes* puberulous, about as long as the petiole, peduncle short, 2 in long, branches 2, racemose, with many pairs of minute, ovate, acute bracts, pedicels rather stout, 1.5 in long, buds ovoid *Calyx* very small, lobes scarcely 0.25 in long, margins hyaline, scales very small, 5 opposite to and 5 alternate with the lobes *Corolla* tube very short, lobes ovate-oblong, acute, 1.5 to 2 in long, slightly overlapping to the right, reflexed in flower *Corona* processes 5, behind the filaments, bifid, the lobes subulate, inner one the longer, 0.3 in long *Stamens* inserted on the corolla tube filaments slender, broadened and connected at base, anthers rounded, connective produced in an acuminate tip, pollen granular, in many masses, each made up of 3 to 4

grains adherent lineally Style short, rather slender style-apex 5 angled below, convex above Fruit and seeds not known.

KEDAH small islands near Langkawi, Curtis 3684

## 7 ATHERANDRA Dene

Slender glabrous climbing shrubs Leaves opposite Flowers in lax axillary and terminal peduncled dichotomous cymes Calyx-tube turbinate, 5 partite, patent in end scales 5, quadrate, crenulate Corolla rotate tube short, narrowed at the base lobes elongate slender, linear-lanceolate, overlapping to the right, twisted to the left in end Corona processes 5, filiform, at the back of the bases of the filaments Stamens inserted at the base of the corolla-tube, filaments free, alternate with erect glands anthers ovate, subhastate at base, connate with the style apex appendages long acute, membranous, combined in a cone over the style apex pollen-carriers of a viscid basal gland attached to the base of the style-apex appendices oblong-spathulate, bearing many pollen-granules of 4 grains arranged in line or in tetrads Ovary conical sunk in the calyx-tube style slender short, style apex long, conical, 5 lobed at base Fruit not known — DISTRIB One species

ATHERANDRA ACUTIFOLIA, Dene in DC Prodr VIII 497 (1844) A longer twining shrub branchlets dark brown, slightly rough innovations puberulous Leaves chartaceous when dry, oblong-lanceolate or obovate-oblong, acute or cuspidate at apex, attenuate and then 1 indented at base, glabrous on both surfaces and reddish or greyish black when dry, dark on the upper, almost glaucous on the lower, margins slightly recurved 2 to 3.5 in long, .75 to 1.75 in broad, midrib slender, raised beneath, sometimes puberulous main nerves 5 to 8 pairs, very slender, arching upwards to and along the margin secondary nerves few, reticulations inconspicuous petiole slender, 2 to 4 in long Cymes very slender, reaching 3 in in length and about the same in breadth, peduncles slender, about 1 in long, branches capillary, nearly as long, bracts in pairs, linear subulate, 1 to 1.5 in long, podicels capillary, curved, .75 in long, somewhat enlarged under the calyx buds conical, acuminate, .5 in long, flowers few, brownish yellow, distant Calyx-tube turbinate, with 5 small scales at the throat, lobes spreading lanceolate, .06 in long Corolla-tube very short lobes linear, .75 in long, twisted in bud to the right, then straight, recurved in flower Corona-processes filiform, nearly 1 in long, behind the stamens Fruit and seeds not known Miq Fl Ind Bat II 467, Hook f Fl Br Ind IV 9 A pubescens, Blume Mus Bot Lugd-Bat I 147, t xxvi Miq lc 468 A cuspidata, Blume lc, Miq lc Cryptolepis filiformis, Wall Cat 4458

KEDAH at Cough, Langkawi Island, *Curtis* 2591 PENANG *Wallich* 4458 —DISTRIB Java (*Lobb, &c*)

In *Curtis*' specimen the glands between the filaments are very small or sometimes none but otherwise the specimen agrees well enough with *Wallich* °

### 8 STREPTOCAULON, Wight & Aitn

Twining herbs and shrubs, usually tomentose. *Leaves* opposite. *Flowers* small, often minute, in lax sessile or peduncled trichotomous panicle cymes in one axil only of a pair of leaves. *Calyx* minute, 5 partite, with 5 scales within at the base. *Corolla* rotate tube very short, lobes ovate, slightly overlapping to the right buds conical or pyramidal. *Corona* processes filiform adnate to the backs of the filaments. *Stamens* inserted at the base of the corolla filaments very short alternating with minute glands anthers oblong adherent to the style apex appendages small, black, triangular connate over the style-apex, pollen-carriers of a viscid gland attached to the base of the style apex appendicles spatulate funnel-shaped pollen masses 2 in each anther-cell composed of pollen granules, each of which consists of 3 to 4 grains arranged in lines or tetrads. *Ovary* of 2 distinct carpels style short, style-apex 5 angled, depressed, top convex. *Fruit* of 2 divaricate follicular mericarps, usually pubescent. *Seeds* flattened, keeled on the ventral surface, oblong tip broad, surmounted by a long white silky coma, testa very thin albumen very scanty cotyledons ovate oblong flat, radicle cylindric, nearly as long as cotyledons. DISTRIB 6 to 7 species, of India and the Malay Peninsula and Archipelago, and the Philippine Islands

Main nerves of leaf 6 to 8 pairs, corolla lobes under 1 in long

follicles under 3 in long

1 *S. Wallichii*

Main nerves of leaf 14 to 16 pairs, corolla lobes over 1 in

long, follicles over 3 in long

2 *S. Griffithii*

1 *STREPTOCAULON WALLICHII*, Wight Contrib 65 (1834) A slender climbing shrub with very milky juice, branchlets slightly angled, with dark brown bark and occasional small lenticels, uppermost and innovations densely shortly brown-pubescent. *Leaves* subcoriaceous elliptic or elliptic-lanceolate, acute with a short apiculus at apex, cuneate at base or occasionally rounded, upper surface dull brown when dry and puberulous, lower densely and softly brown tomentose, margins slightly recurved, 2 to 5 in long, 1 to 2.5 in broad, midrib slender, slightly impressed above, prominent beneath main nerves 6 to 8 pairs, at an angle of about 60° with the midrib, curved gradually upwards to

and along the margin, secondary nerves none, reticulations minutely netted but not prominent, petiole 25 to 5 in long, channelled above. *Cymes* spreading, much-branched, many flowered, hispidly pubescent, reaching 1.5 to 2 in long and 2 to 2.5 in broad, peduncles usually short, about 25 in long, branch peduncles 5 in, rest gradually shorter. Bracts many, in pairs, small, ovate acuminate, pedicels slender, buds ovoid-pyramidal, flowers glabrous, reddish. *Calyx* tube turbinate, lobes ovate-oblong, 0.25 in long, often emarginate hyaline at the edges, scales minute, obtuse. *Corolla* tube very short, cylindric, then rotate, lobes oblong, 0.75 in long, obtuse, tips incurved. *Corona* processes 0.3 in long, tips glandular. *Follicles* slender, 3 in long, 3 in broad divaricate in a straight line, tips slightly hooked, pericarp thin, densely greyish tomentose. *Seeds* oblong, rounded at base, keeled on the ventral surface, 25 in long by 0.5 in broad, broad at tip and with a thick white silky coma 1 to 1.25 in long, testa thin, brown, shining, albumen very scanty, cotyledons ovate-oblong, acute, 1 in long, radicle slender, cylindric. Wall Cat 8249B, Dene in DC Prodr VIII 496. Mq Fl Ind Bat II 469. Hook f Fl Br Ind IV 9.

KEDAH on Lankawi Island, Ridley 8295. Bell in Cantley 229. KLANG RIDLEY of Trans Linn Soc, Ser 2, III 320. PERANG Phillip, Mangay (K.D.) 1100. Deschamps Stoliczka G. King Curtis 172, 2122. Ridley 9484, King's Collector 4910, 5188. PROVINCE WILHELM at Arakudi, Ridley 6972. PERAK *Scortechini* King's Collector 2509. Ridley 3072. SINGAPORE Wallich 8249B.

2. STIPITOCALON GRIFITHII, Hook f Fl Br Ind IV 10 (1883). A climbing shrub, branchlets dark purplish brown, pubescent, innovations hispidly tomentose. *Leaves* subcoriaceous, obovate-oblong or oblanceolate, shortly acuminate at apex, narrowed and finally rounded or cordate at base, upper surface greyish and puberulous, lower densely greyish brown tomentose, margin slightly reflexed, 3 to 4 in long, 1 to 2 in broad, midrib stout beneath, more slender and impressed above, main nerves 14 to 18 pairs, at about 60° with the midrib, at first straight, then curved to and along the margin, secondary nerves none, reticulations minutely netted, the larger ones transverse between the main nerves, all slightly impressed above and raised beneath, petiole 25 in long. *Cymes* dichotomous, hispidly tomentose, 1 to 2 in long and broad, peduncle 25 in long, branches furnished with many pairs of opposite persistent ovate-acute hirsute bracts, petiole slender, 15 in long, buds ovoid-conic. *Calyx*-tube turbinate, lobes ovate-acute, hirsute without, glabrous within, margins hyaline, scales minute, 2 to 3-lid. *Corolla* tube very short or none, lobes rotate, ovate-acute, 1 to 1.5 in long, glabrous but minutely punctulate without. *Corona*



processes filiform, on a conical base in a discoid ring. *Pollen-carrier* appendices broadly linear, bifid. *Follicles* slender, straight, 3 to 4 in long, 5 in broad, recurved to about 270°, tips slightly hooked, pericarp chartaceous, minutely pubescent without, smooth within. *Seeds* oblong, contracted above in a short neck, truncate at tip, also at base, keeled on the ventral surface, 3 in long, 1 in broad, tip with a dense white silky coma about 1 in long, testa thin, black, cotyledons ovate, acute, 125 in long, radicle slender, cylindric 0.75 in long. *Styptocaulon*, Griff. Notul. IV 71, and Ic. Pl. Asiat. t. 406.

JOHORE at Batu Pahut, Ridley 11120.—DISTRIB. Burma (Tenasserim, *Holfer* (K.D.) 3754, Mergui, *Griffith*), Siam (*Schomburgk*), Tonkin

## Tribe II. SICAMONÆ

Filaments of the stamens connate into a tube and adnate at top to the dilated part of the style. Appendages of the anthers more or less fimbriate. Pollen-contents of each anther cell of two very minute distinct waxy masses sometimes combined into one. Pollen carriers minute, subquadrate, soft, the pollen-masses attached to them in fours or pairs.

Corolla lobes imbricate usually glabrous or merely puberulous within.

Corolla tube not lined by a toothed membrane, corona thin—

Corolla lobes small overlapping to right or left, style apex short rounded, obtuse, pollen masses in fours on a minute carrier.

9. SICAMONÆ

Corolla lobes overlapping to left usually rather large, style apex elongate conical or clavate, pollen masses in pairs (or very obscurely only in fours) on a minute thick carrier.

10. TONOCARIUS

Corolla tube lined by a toothed membrane, corona short thick.

11. GONIOGEMMA

Corolla lobes valvate, villous within.

12. GENIANTHUS

## 9. SICAMONÆ, B1

Climbing or straggling shrubs or undershrubs. *Leaves* opposite. *Flowers* small, often minute, in lax axillary sessile or shortly peduncled 2-3 cymose. *Calyx* 5-partite, without scales within. *Corolla* small, rotate, 5-lobed, lobes overlapping to right or left, tube very short. *Corona* processes 5, adnate to the staminal column, compressed. *Stamens* inserted at the base of the corolla, filaments connate at the base only, anther-tips ending in a small inflexed appendage, connivent around the style-apex, pollen-masses very minute, globose or slightly oblong, in pairs in each cell, attached in fours to the minute pollen-carriers, without caudicles. *Ovary* of 2 carpels, style columnar,

dilated, ending in a flattened ring and produced in a beak above it style-apex rounded or bifid, exerted beyond the anthers *Fruit* of 2 divaricate follicular mericarps, terete or angular, acuminate, smooth *Seeds* flattened, oblong, ending in a long white silky coma, albumen scanty, cotyledons linear-oblong, radicle rather long, cylindric--  
**DISTRIB** Species about 30, chiefly of South and Tropical Africa and the Mascarene Islands, a few in India, Malaya, and the islands, extending to Australia

**SECAMONE MICRANTHA**, Dene in DC Prodr VIII 501 (1844) A small climbing shrub, branchlets slender, terete, the size of a crow-quill, nodes enlarged *Leaves* membranous, ovate-lanceolate, acuminate and apiculate at apex, attenuate at base, both surfaces olive-green when dry, the lower paler, glabrous, margins recurved, 1.5 to 3 in long, .35 to 1 in broad, midrib slender, main nerves about 8 to 10 pairs, obscure, curving acutely upwards to meet an obscure intravaginal nerve reticulations scarcely visible, petiole slender, 1 to 2.5 in long *Cymes* spreading pubescent, 1 to 2 in long and the same broad, branches usually 2 chotomous below, 3 chotomous above, main peduncle variable, reaching 1 in long branch peduncles slender, flexuous often zigzag about 25 in long pedicels 1 in, bracts very small, ovate acute, hispidly hairy buds globose flowers pale yellow *Calyx* deeply cleft lobes ovate, white on the margins, scarious above, black gland dotted on the claw .05 in long *Corolla* lobes deeply cleft, glabrous, .075 in long obtuse 3 nerved *Corona*-processes very narrow, compressed, with a rounded tooth on the back *Follicles* 2, slender, divaricate in a straight line (180°) or nearly so, 3 in long, 3 in broad acuminate tips slightly incurved, pericarp thin, glabrous, striate *Seeds* ovate spatulate truncate at tip, flattened, submembranous on the margins, bearing a copious white silky coma, .5 in long, .125 in broad testa thin, brown shining Miq Fl Ind Bat II 472 *Tylophora micrantha*, Dene Herb Tim Desc in Nouv Ann Mus Se III (1834) 377

**SIAMI SI STAFIS** Tiang, King's Collector 1414 KEDAH on Langkawi Island, Curtis 2800 PENANG Curtis 225, 992, 1896 — **DISTRIB** Java, Timor

We cannot separate from this *S. Inlaysonii*, Wight Contrib 61 (1834) Wall Arch No 103 probably from Siam

# 10 TOXOCARPUS, Wight & Allen

Twining shrubs *Leaves* opposite *Flowers* small or moderate sized, in axillary dichotomous paniculate or racemose cymes *Calyx* minute, 5 partite, with or without 5 minute scales within at the base

shrub, branchlets brown, striate, with purplish-brown rather stiff pubescence. *Leaves* coriaceous when old, almost membranous when young, ovate oblong or ovate, acuminate at apex, acute at base, both surfaces olive green when dry, rather dull, lower paler, glabrous except on the midrib beneath, margins recurved, 3 to 4 in long, 1 to 1.75 in broad, midrib prominent on the lower, impressed on the upper, surface, main nerves 7 to 8 pairs, pale, raised on the lower surface, starting at an angle of  $50^\circ$  with the midrib and curving upwards to meet in a looped intramarginal nerve, secondary nerves few, reticulations irregular, prominent on the lower surface, petiole 3 to 5 in long, rusty-pubescent. *Cymes* axillary, sessile, densely clothed as in the calyx with purplish-brown pubescence reaching 75 to 1 in long, branches few, few flowered bracts minute, deciduous, pedicels about 1 in long, thick buds oblong flowers rather large. *Calyx* lobes ovate oblong, glabrous within, 1 in long, scales 0 or minute, alternate with the lobes within. *Corolla* tube short 1 to 2 in long lobes obovate oblong, glabrous, 35 to 5 in long spreading in flower. *Corona* processes flat, truncate much shorter than the anthers when young, when older furnished with an erose tip as long as the anthers, minutely gland-dotted. *Style* apex pyriform clavate, 1 in long the tip conical, bifid, in acuminate lobes. *Follicles* 3 in long 4 to 5 in broad, cylindric, acute, pericarp smooth thick, brown. *Seeds* ovate, flattened, with a shining margin, 6 in long, 25 in broad testa brown thin.

PERAK *Scottichina* 630 at Lurut Hill, 3000 ft. *Derry* (Curtis 2706)

The leaves in the two specimens seem at first to differ considerably but the flowers agree and we believe the difference is merely due to *Scottichina*'s leaves coming from a much older plant.

4 *TOXOCARPUS PINANGIANUS* King & Gumble, n. sp. A slender twinning shrub, branchlets pale brown, striate, hispid with ferruginous brown hairs. *Leaves* chartaceous lanceolate or oblanceolate cuspidately acuminate at apex, acuminate cuneate at base, nearly black, shining and glabrous except on the midrib on the upper surface, pale and glabrous on the lower except on the midrib or main nerves, margins recurved 3.5 to 4.5 in long, 1 to 1.25 in broad, midrib stout, impressed above, raised beneath, main nerves 6 to 8 pairs, irregular but usually at an angle of about  $50^\circ$  with the midrib, slightly curved to meet an intramarginal looped nerve, secondary nerves few, reticulations irregular, prominently netted on the under surface, petiole 2.5 to 3.5 in long, bordered by the narrow decurrent margin of the blade, densely rusty pubescent. *Cymes* slender, rusty pubescent, divaricate, reaching 2 in in length and about 4 in in breadth, sessile or very shortly

pedunculate; branches usually dichotomous, slender, bearing clusters of flowers at rather long intervals; bracts minute, subulate, pedicels 0 to .1 in long, buds conical, flowers reddish-brown. *Calyx* hispidly rusty-pubescent, lobes ovate-acute or rounded, .05 in long, gland-dotted. *Corolla* campanulate, tube as long as lobes, lobes ovate, margins incurved, 1 in. long, shortly villous within. *Corona*-processes very small, as long as anthers, bifid at apex. *Style-apex* columnar, clavate when young. *Fruit* not known.

PENANG. at Moniot's road, *Curtis* 2303

5. *TOXOCARPUS LANKAWIENSIS*, King & Gamble, n sp. A slender twining shrub, branchlets thin with brown bark. *Leaves* chartaceous, elliptic, shortly cuspidate-acuminate at apex, rounded at base, both surfaces greyish-green when dry, glabrous except along the midrib beneath, margins slightly recurved, 3 to 3.5 in long, 1.75 to 2 in broad, midrib slender impressed above, raised beneath as are the 5 to 6 pairs of main nerves which start at an angle of 60° with the midrib and curve upwards to join in a looped intramarginal nerve, secondary nerves few, reticulations irregular, petiole slender, .25 to .3 in long, hispid. *Cymes* axillary, sessile, pubescent, .5 to 1 in long, corymbose, the flowers racemously clustered on the branches, bracts persistent, minute, ovate-acute, bracteoles similar, in sheathing pairs to each very short pedicel, buds conical, about .15 in long, flowers yellowish with purple glandular dots. *Calyx*-tube short, .05 in long, lobes ovate-oblong, acute, ciliate, .1 in long, scales 0. *Corolla* campanulate, tube .1 to .15 in long, lobes triangular-acuminate, blunt, irregular, .05 to .1 in long, pubescent within, both with glandular purple dots. *Corona*-processes adherent to the anthers and longer than them, each incurved over the style-apex and with an upturned lobe on the back. *Style-apex* columnar, on a broad annulate base. *Fruit* not known.

KEDAH. Langkawi Island, *Curtis* 2616

# 11 GONIOSTEMMA, Wight

Slender climbing shrubs with warted bark. *Leaves* opposite. *Flowers* in interpetiolar, lax, many-flowered, paniculate cymes. *Calyx* 5-partite, lobes rounded, with 5 glandular scales at the base within. *Corolla* campanulate-rotate, tube lined by a toothed membrane, lobes overlapping to the left. *Corona* short, thick, the 5 processes combined in a 5-lobed tube adherent to the base of the staminal-column, the lobes triangular, shorter than the column. *Staminal-column* attached to the base of the corolla-tube, fleshy, much shorter than the style, anthers slender; appendages erect around the style-apex, pollen-masses

single or in pairs in each cell attached to minute pollen-carriers without caudicles. *Ovary* of 2 carpels, style-apex 5-angled below, produced above in a long fusiform tip. *Fruit* of 2 follicular mericarps, follicles nearly parallel, thick, lanceolate. *Seeds* large, flattened, broadly winged, cotyledons elliptic, nerved, radicle cylindric. — **DISTRIB** One species

**GNONOTEMMA ACUMINATUM**, Wight Contrib 62 (1834). A slender climbing shrub, stem glabrous, pustular, branchlets with smooth brown bark. *Leaves* somewhat fleshy when green, chartaceous and wrinkled when dry, ovate-oblong, acuminate at apex, cuneate to almost rounded at base, dark green, when dry dark olive green on the upper and pale brown on the lower surface. margins recurved, 3 to 5 in long, 1 to 1.75 in broad, midrib broad, conspicuous and usually pale on the upper, obscure on the lower surface, main nerves very obscure, about 10 to 14 pairs, at about 70° with the midrib, straight to join an obscure intramarginal nerve, secondary nerves many, irregular, reticulations indistinct, petiole slender, .75 to 1.25 in long, channelled above. *Cymes* axillary or terminal, paniculately corymbose, reaching 6 to 7 in in length and 5 to 6 in in breadth, 2 to 3 crotomous. main peduncles slender, 1.5 to 3 in long or sometimes 0, primary branches 1 to 2 in long, remainder smaller by degrees. pedicels slender, 2 in long. bracts minute, acute. flower buds oblong, 2 to 3 in long. flowers cream-coloured. *Calyx* lobes orbicular, .05 in long, ciliate on the margins, gland-dotted near the base, usually with 5 minute scales within, alternate with them. *Corolla* lobes oblong-acute, glabrous, 15 in long, tube 1 in long, lined within by a membrane which ends in 5 triangular acute ciliate teeth. *Style* apex fusiform, 1 in long. *Follicles* thick, recurved so as to lie nearly parallel and nearly meet at the tips, which are slightly hooked. 4 to 6 in long, .75 in broad, pericarp smooth. *Seeds* many, flat, ovate, .75 in long, .25 in broad, ending in a broad flat beak, surmounted by a 2 in long white silky coma. margins winged, testa thin, brown, albumen scanty, cotyledons oblong, 3 nerved, 2 in long, 1 in broad, radicle cylindric, 15 in long. Wall Cat 8242. Dene in DC Prodr VIII 504. *Toxocarpus acuminatus*, Benth in Gen Pl II 747. Hook f Fl Br Ind IV 15.

**PENANG** on Government Hill, 1000 to 1200 ft, *Curtis* 244, *Hullett* 182. **PERAK** at Taiping and Sungie Larut, *Wray* 2369, 2868, 3046, clinging to trees in dense forest near Larut, *King's Collector (Kunstler)* 2520, 6546, 6686, 10490. — **DISTRIB** India (Sylhet, *Wallach* 8242).

12. GENIANTHUS, Hook f.

Twining shrubs *Leaves* opposite *Flowers* small, in clusters in axillary, subsimple or dichotomously branched, often racemose or spicate cymes *Calyx* very small, 5-fid, scales 5, between the bases of the lobes within *Corolla* rotate, tube short, lobes narrow, spreading or recurved, villous on the inner face, valvate *Corona* of 5 often lobed processes adnate to the back of the staminal-column and often longer than it *Staminal-column* short, anthers erect, appendages short, around the style-apex and shorter than it, pollen-masses 2 in each cell, rounded, granular, on a small curved pollen-carrier without caudicles *Ovary* of 2 carpels, style thick, style-apex 5-angled below, tip capitate or long and slender *Fruit* of 2 divaricate, thickened, usually obtuse, follicular mericarps, testa thickened, often tomentose *Seeds* large, flattened, winged, with a long silky coma, cotyledons small, radicle cylindric — **DISTRIB** About 6 species, of India and Malaya.

*Leaves* more or less lanceolate, glabrous or nearly so beneath —

*Leaves* usually under 3 in long, shortly acuminate; cymes rarely up to 4 in long, with close flower-clusters .. 1. *G. Maingayi*

*Leaves* usually over 3 in long, long-acuminate, cymes reaching 6 in in length, with distant flower-clusters .. 2. *G. Ridleyi*

*Leaves* elliptic ovate or -obovate, ferruginous-tomentose beneath —

Main nerves of leaves at about 50° with the midrib; follicles densely rufous-velvety .. 3. *G. rufo velutinus*

Main nerves of leaves nearly at right angles with the midrib; follicles glabrous .. 4. *G. Blumei*

1 GENIANTHUS MAINGAYI, Hook f in Fl. Br Ind IV 16 (1883)  
A slender climbing shrub, branchlets brown, terete, the uppermost purplish-pubescent, nodes swollen *Leaves* coriaceous, obovate or oblanceolate, shortly acuminate at apex, cuneate at base, greyish-green when dry, the lower surface somewhat paler than the upper, both slightly pubescent when young, margins strongly recurved, 2.5 to 3.5 in long, 1.25 to 1.5 in broad, midrib prominent, with a gland at the base, raised on the lower, impressed on the upper surface, as are the 6 to 7 pairs of main nerves which curve upwards to join a looped intramarginal nerve, secondary nerves few, reticulations few, irregular, rather broad, petiole 2.5 to 5 in. long, twisted. *Cymes* in pairs from the leaf-axils, up to 4 in long, bearing clusters of sessile flowers racemosely arranged, rachis angular, purplish-pubescent; bracts minute, ovate-acute, buds clavate, flowers white with a reddish tinge *Calyx* purplish-pubescent without, lobes oblong, obtuse, .05 in. long, with minute scales alternate with them at the base within *Corolla*-

tube short, 0.25 in long, lobes linear-oblong, obtuse, recurved in flower, covered within with yellowish villous hairs. *Corona*-processes 2-lobed, dark, longer than the staminal-column. *Style-apex* clavate, acute, 0.5 in long. *Fruit* not known.

**PERAK** on trees in dense jungle near Larut, *King's Collector* 5119  
**SINGAPORE** *Meringay* (K D) 1106

2 **GENIANTHUS RIDLEYI**, King & Gamble, n. sp. A slender twining shrub, branchlets striate, with scattered round tubercles and covered with thick ferruginous pubescence. *Leaves* fleshy when fresh, chartaceous when dry, ovate-oblong or -lanceolate, acuminate at apex, rounded at base, dark olive brown, dull and glabrous on the upper surface, pale and mottled and glabrous on the lower except along the midrib, margins recurved. 3 to 5 in long, 1 to 2 in broad, midrib slender, pale, raised on the lower surface, a cluster of small glands at the base, main nerves 6 to 8 pairs, pale, starting at an angle of about 70° with the midrib and curved upwards to meet in loops near the margin. Secondary nerves irregular reticulations obscure, chiefly transverse. Petiole rusty pubescent, twisted 5 to 7.5 in long. *Cymus* slender, divaricate, rusty pubescent, racemosely paniculate, reaching 6 in in length and 8 in in breadth. Peduncles none or short (up to 5 in long). Brinches slender, the flowers in distinct clusters of about 3 to 5 bracts very small, ovate, deciduous, pedicels slender, up to about 15 in long. Buds ovoid. *Calyx* tube short, lobes ovate-oblong rounded, 0.5 in long, glabrous within, densely ferruginous villous without. *Corolla* lobes free almost to the base, oblong, bluntly apiculate, recurved in flower, 1.5 in long, covered in the upper half within with a dense white beard. *Corona* processes acuminate, longer than the anthers. *Pollen* carrier gland rounded, bifid, pollen masses obscurely in fours. *Style apex* columnar, 0.75 in long. *Fruit* not known.

**PERAK** on Maxwell's Hill *Ridley* 2988. *Scottish* 1172. at Larut, 3000 to 3500 ft. *King's Collector* 2612.

3 **GENIANTHUS RUFOVELUTINUS**, King & Gamble, n. sp. A climbing shrub, branches and branchlets stout, densely clothed with soft chocolate brown tomentum, nodes somewhat swollen. *Leaves* coriaceous, elliptic-ovate or -obovate, acuminate at apex, cuneate or attenuate or rounded at base, upper surface shining, glabrous or slightly villous, pubescent on the midrib and main nerves. Lower surface ferruginous villous, especially on the nerves, dull, margins strongly recurved, 4 to 6 in long, 2 to 3 in broad, midrib stout, impressed above, as are the 7 to 9 pairs of main nerves which, leaving the midrib at an angle of about 50°, are at first straight and then curve upwards to join a rather obscure intramarginal looped nerve, also impressed, secondary nerves

few, reticulations transverse, irregular, petiole stout, 75 to 1 in long, densely ferruginous-tomentose *Cymes* densely ferruginous-tomentose, few-branched, on 25 to 5 in long peduncles, reaching 4 in long and broad, branches spicate-paniculate, the flowers in small clusters, sessile or very shortly peduncled, bracts minute, ovate acute, deciduous, buds oblong-conical flowers cream-coloured *Calyx* campanulate, tube short, 0.25 in long lobes ovate, glabrous within, as long as tube, scales between them within 0 or very minute *Corolla*-tube short, 0.5 in long lobes linear oblong, 1 in long, densely white villous within *Corona* adherent to the staminal-column below, free above and longer, each process furnished with an upturned tooth on the back *Stamens* slender, appendages acute, pollen carriers semicircular, pollen-masses 2 to each cell, rounded *Style*-*apex* columnar, ringed at the base *Follucles* divaricate in one straight line cylindric, very obtuse, 4 in long, about 1 in broad pericarp densely covered with chocolate brown soft wool *Seeds* oblong, slightly winged 75 in long, 25 in broad, produced above in a short beak broad at the tip which bears a copious whitish silky coma 2 in long testa thin, albumen scanty cotyledons (immature) oblong radicle stout

**PIRAK** on large trees in dense forest, *King's Collector* 5611, 6865, 6882

4 **GENIANTHUS BLUMERI**, King & Gamble A climbing shrub branches stout, the size of a swan's quill, brown, rugose, lenticellate, branchlets ferruginous tomentose *Leaves* elliptic-ovate or obovate, shortly acuminate at apex, attenuate when young, rounded when old at base upper surface glabrous except on the midrib, punctulate, lower surface densely ferruginous tomentose when young, less so when old, margins recurved, 3 to 6 in long, 2 to 4 in broad, midrib stout, impressed above, much raised beneath, sometimes with small glands at the base main nerves 7 to 10 pairs, strong, lower ones nearly at right angles to the midrib, upper at about 60°, at first straight, then curved to wind along the margin, impressed above, secondary nerves none reticulations netted, obscure, petiole 5 to 75 in long, twisted at base, tomentose *Cymes* subsessile, lateral, up to 3 in long, branches divaricate, bearing sessile clusters of densely tomentose small flowers, buds ovoid *Calyx* lobes ovate, acute, densely ferruginous-pubescent without *Corolla*-lobes very short, white villous within *Corona*-processes ending in a linear truncate ligule *Style*-*apex* elongate apiculate *Follucles* 2, divaricate in a straight line, cylindric, obtuse tip slightly recurved, 3 to 4 in long, 75 in broad, pericarp very thick, smooth, glabrous *Seeds* ovate, 6 in long, 3 in broad, margin winged, tip truncate, bearing a 2 in long pale brown silky coma, cotyledons cordate, 25 in long, radicle cylindric, 15 in long *Toxocarpus Blumeri*, Dene in DC Prodr VIII



506, Miq. Fl. Ind Bat II. 475. *Secamone macrophylla*  $\beta$ . *fulva*, Bl. Bijdr. 1050, Hassk. Cat. Bog. 125.

PERAK · at Sungie Larút, Wray 2287, *Scortechini*.—DISTRIB. Java

There is some doubt about this species, due to the only specimen of the Java plant available being very imperfect, while both Wray's and Scortechini's specimens are in fruit only

### Tribe III CYNANCHEÆ

Filaments of the stamens connate in a column if present, anthers adnate to the upper part of the style, with membranous appendages Pollen-contents of each anther cell united in a waxy mass, the pollen masses opaque, attached in pairs to the pollen carriers by short or long caudicles from which they are pendulous in the anther cells Pollen-carriers turgid, rarely flattened with a dorsal suture, hard and horny reddish brown to black, attached at the angles of the style-apex.

Corona of 5 processes adnate to the anther column —

Stem erect —

Corona processes laterally compressed, crenately curved at base

13 CALOTROPIS

Corona processes cucullate with an interior horn

14 ACETIFLUA

Stem twining —

Flowers large fleshy, corona processes 5 in long, adnate to the column

15 RHAPHIANTHEMA

Flowers small thin, corona processes about 1 in long, attached to the base of the column..

16 ICHNORHIZMA

Corona annular, adnate to the base of the column and surrounding it

17 CYNANCHUM

### 13 CALOTROPIS, Bl

Erect large shrubs or small trees *Leaves* opposite, broad, subsessile *Flowers* medium-sized, in umbellate or subracemose pedunculate cymes, arising laterally from the stem between the bases of the leaves *Calyx* 5 lobed, the lobes with small glandular scales at the base within *Corolla* broadly campanulate or subrotate, divided more than half-way down in 5 broad valvate lobes which are usually reflexed in flower *Corona* of 5 laterally compressed fleshy processes, adnate to and standing out as buttresses from the staminal-column, furnished at the base with an upcurved and involute spur, bifid at the apex or with two obtuse auricles *Stamens* inserted at the base of the corolla, the anthers short, broad, somewhat horny at the angled wings, appendages short, broad, slightly lobed, membranous, inflexed over the style-apex, anther-cells a shallow membranous pouch, pollen-masses solitary, pendulous, flattened, spatulate, attached by slender jointed caudicles to the oblong, somewhat quadrate, pollen-carrier *Ovary* of 2 distinct cells,

joined in a slender style bearing a depressed pentagonal style-apex. *Fruit* of 2 large, inflated, fleshy, thick, follicular mericarps. *Seeds* ovate, plano-convex, with broad apex surmounted by a coma of long slender silky hairs.—*DISTRIB* Species 4, of Tropical Asia in India, China, and the Malay Archipelago, one extending into Africa

*CALOTROPIS GIGANTEA*, Bt in Ait Hort Kew, ed 2, ii 78 (1811)  
A large shrub, sometimes almost a small tree, branches stout, fleshy, with ash-coloured bark, branchlets covered with soft white woolly tomentum. *Leaves* somewhat leathery when green, membranous when dry, elliptic-oblong or obovate-oblong, acute at apex, cordate at base, both surfaces when young covered with very short white cottony tomentum, when old the upper glabrous, the lower glabrescent, 4 to 8 in long, 2 to 4 in broad midrib broad, with a large gland at the base on the upper surface. *main nerves* 6 to 8 pairs, the lowest curved downwards, the rest upwards to and along the margin, reticulations few, not prominent. *petiole* none or extremely short. *Cymes* densely white tomentose, on peduncles 1.5 to 4.5 in long, branches none or few, 1 to 1.5 in long, bearing umbels of 6 to 12 flowers on thick pedicels reaching 1 to 1.25 in long, bracts linear oblong, deciduous buds ovoid, obtuse. *flowers* greyish white with rose or lilac markings, 1 to 1.5 in in diam. *Calyx* lobes ovate acuminate, about 1.5 in long, cottony without, glands usually about 3. *Corolla* lobes ovate lanceolate, acute, reflexed in flower, 2.5 to 5 in long. *Corona* processes 2.5 to 3.5 in long, with obtuse auricles on either side near the apex and much incurved spur at the base the keel puberulous. *Anther* appendages 2 to 3 lobed, short, curved over the style apex. *Ovary* and style 3.5 in long, slender style apex star shaped, flat, 1.5 in broad, the umbo depressed, the horns of the star bearing the pollen-carriers. *Follicles* 3.5 to 5 in long, oblong, broad, thick, fleshy, ventricose, pale yellow or green when fresh, recurved. *Seeds* numerous, 2.5 to 3 in long by 2 in broad, broadly ovate, flattened testa brown, narrowly margined, minutely tomentose, coma 1 to 1.25 in long, cotyledons ovate-cordate, 1.25 in long, radicle .05 in long, ovate, acute. *Hamilt* in Trans Linn Soc XIV 245, *Wight Contrib* 53, and *Ill t* 155, 156A, *Dalr & Gibs Bomb Fl* 149, *Brandis For Fl* 331, *Griff Notul* IV 68, and *Le Pl Asiat t* 397, 398, *Dene in DC Prodr* VIII 535, *Bot Reg t* 58, *Miq Fl Ind Bat II* 481, *Hook f Fl Br Ind IV* 17, *Bot Mag t* 6862, *Kurz For Fl II* 200, *Trimen Fl Ceyl III* 148, *Cooke Fl Bomb II* 151, *Plain Beng Plants* 688, *Watt in Kew Bull* 1900, p 8 *Asclepias gigantea* Willd Sp Pl 1264, *Roxb Hort Beng* 20, and *Fl Ind II* 30. "*Eruc*" and "*Bel eruc*," *Rheede Hort Mal II* 52, 56, t 31.

PENANG *Haji Husain* for *Curtis* PERAK *Wray* 2123 (introd),

*Scortechini* MALACCA *Mannujay* (K D) 1107 SINGAPORE *Cuming*  
2408 —DISTRIB India, Burma, Ceylon, Malay Islands, S China

## 14 ASCLEPIAS, Linn

Perennial herbs or shrubs, often with tuberous roots, juice milky, stems usually erect. *Leaves* opposite or whorled. *Flowers* in pedunculate or sessile umbels, terminal or lateral between the leaves, usually orange-yellow, red or green. *Calyx* deeply 5-partite, with 5 to 10 glandular scales within at the base. *Corolla* rotate, deeply 5 lobed, the lobes valvate or slightly overlapping in bud, lobes usually reflexed when open. *Corona* of 5 processes arising from the staminal column and adnate to it above. lobes erect, concave cucullate, with usually a tooth-horn protruding from within. *Stamens* affixed to the base of the corolla. the filaments connate in a tube. anthers with a membranous appendage inflexed over the style apex. pollen-masses pendulous, flattened, solitary in each anther-cell, attached to the hard pollen-carriers by caudicles. *Styles* free below, connected above style apex columnar, truncate or depressed and often umbonate at tip. *Follicles* variable, smooth or softly echinate. *Seeds* comose.—DISTRIB Species many, chiefly of Africa and America, 2 only in Arabia and the Orient, and 2 naturalized in most warm regions.

ASCLEPIAS CURASSAVICA, Linn Sp Pl I 215 (1753) A perennial erect herb, stems 2 to 3 ft high, pale, glabrous, smooth. *Leaves* lanceolate, acuminate at apex, cuneately acuminate at base, glabrous on both surfaces. 2.5 to 5.5 in long, .5 to 1 in broad midrib slender, raised beneath, main nerves 12 to 15 pairs, irregular, curving upwards at an acute angle. reticulations not very prominent. petiole .25 to .5 in long. *Umbels* lateral and terminal, 6 to 12-flowered. peduncles 1 to 3 in long, puberulous. pedicels .5 to .75 in long, puberulous. buds ovoid. flowers orange scarlet. *Calyx* lobes lanceolate, acute. .15 in long, puberulous. scales minute. *Corolla* reflexed when open. lobes oblong, acute, .2 to .25 in long, glabrous, slightly overlapping to the right in bud. *Corona* processes arising about .1 in above the base of the staminal column, spatulate-cucullate, .1 to .15 in long with a protruding horn as long as themselves arising from the base within and curved inwards over the staminal-column. *Anthers* auricled at base, appendages orbicular, inflexed over the style-apex. *Style apex* columnar, depressed, 5-angled. *Follicles* lanceolate-acuminate, .3 to .35 in long, pericarp thin, smooth, glabrous. *Seeds* elliptic, plano-convex, .2 in long, .15 in broad, with a broad, thin margin, testa dark brown, thin, lineate, coma .75 to 1 in long, cotyledons ovate, small, radicle cylindric,

nearly as long as cotyledons Roxb Hort Beng 20, Lodd Bot Cab t 349, Bot Reg I t 81, Dene in DC Prodr VIII. 566 Dalz and Gibs Bomb Fl Suppl 54, Miq Fl Ind Bat II 485, Baill Hist des Pl X 221, figs 157-165, Hook f Fl Bt Ind IV 18, N E Brown in Dyer Fl Trop Afr IV 1 328, Cooke Fl Bomb II 180, Prain Beng Plants 689

PERAK *Scortechini* JOHORE *Curtis* SINGAPORE *Hullett* 85 An introduced plant, now naturalized in Africa, India and Malaya, chiefly in waste places near villages —DISTRIB Tropical America, where native

# 15 RHAPHISIEMMA, Wal.

Climbing glabrous shrubs with milky juice *Leaves* opposite, membranous *Flowers* in axillary long peduncled umbelliform or subracemose cymes large, white, long pedicelled *Calyx* deeply 5 fid or 5 partite 5 glandular within at base *Corolla* campanulate, 5 lobed, lobes spreading, twisted in bud, overlapping to the right, tube broad *Corona* processes 5, membranous, subulate acuminate, adnate to the staminal column and produced above it to twice its length *Stamens* affixed to the base of the corolla, filaments connate in a short tube anthers with an inflexed membranous appendage pollen-masses one in each cell, oblong, not compressed, pendulous, waxy, attached to the thick hollow furrowed hard pollen-carrier by short clavate caudicles *Ovary* of 2 carpels style distinct to near the top style apex large, fleshy, 5 lobed, convex at tip *Fruit* of (by abortion) 1 thick, fleshy, 5ooth subventricose follicle *Seeds* plano-convex, margined, comose —DISTRIB Two species, one of India and Burma and the Malay Peninsula, the other of Java

RHAPHISTIEMMA PULCHELLUM, Wall Pl As Rai II 50, t 163 (1831) and Cat 8221A A glabrous climbing shrub, branches greyish-brown when dry, terete, much twisted the nodes with a line of small glands between the leaf-petioles *Leaves* membranous, ovate acuminate at apex, cordate at base, with wide sinus often 75 to 1 in deep, lower surface pale when dry, 3 to 7 in long, 25 to 45 in broad, midrib prominent, bearing at its base a cluster of subulate small fleshy glands main nerves 6 to 8 pairs, the lowest 2 to 3 pairs radiating from opposite the gland cluster, the rest curving upwards and anastomosing near the margin, raised beneath, reticulations few, conspicuous, transverse, petiole 2 to 5 in long, sulcate above *Cymes* 4 to 6-flowered, peduncle 15 to 5 in long, branches few, pedicels slender, 5 to 2 in long, bracts short, lanceolate, deciduous, buds oblong, 5 to 1 in long, flowers white, thick *Calyx*-lobes ovate-oblong, variable in size, usually 15 to 2 in long, glands minute *Corolla*-lobes oblong, obtuse, reflexed in

flower, 5 in long, tube longer *Corona*-processes subulate-acuminate, membranous, 5 in long, 1 in broad *Anthers* horny, yellowish, smooth, sagittate at base, appendages rounded, membranous, incurved over the stigma *Style apex* 5-lobed the lobes hoined, tip umbonate, minutely pitted *Follicles* solitary, fusiform, turgid, somewhat saccate at base, the apex obtuse with a short hook, pericarp leathery, smooth *Seeds* plano-convex with a broad margin, ovate, 4 in long, with a broad apex bearing a silky coma 1 to 2 in long, testa brown, thin, cotyledons ovate, cordate, 125 in long radicle cylindric, 75 in long Wight Contrib 55, Dene in DC Prodr VIII 516 Paxt Fl Gard III t 101, Paxt Mag XIV 27, with fig, Fl des Serres t 223 Miq Fl Ind Bat II 477, Hook f Fl Br Ind IV 19, Prain Beng Plants 691 *Asclepias pulchella*, Roxb Hort Beng 21, Fl Ind II 54

KEDAH Conch, Lankawi Island, Curtis 2118 PENANG Curtis (cult) PERAK in bamboo jungle at about 400 to 600 ft Ulu Bubong, King's Collector 10483 SINGAPORE Deschamps (cult), (r King (cult) DISTRIB India (Sikkim, Chota Nagpur, Sylhet, Assam and Cachet), Burma

#### 16 ISCHNOSTEMMA, King & Gamble, nov. gen

Twining slender undershrubs *Leaves* opposite *Flowers* in slender few flowered, lateral, pedunculate umbels, pedicels filiform *Calyx* 5 fid lobes acuminate *Corolla* rotate tube short lobes long, slender, overlapping to the right, twisted to the left in bud *Corona* of 5 membranous lanceolate flattened processes attached to the base of the staminal-column *Staminal-column* attached to the base of the corolla tube anthers slender appendages short, membranous obtuse connivent over the style apex pollen masses 1 in each cell pendulous ellipsoid, attached by slender clavate descending caudicles to the crustaceous pollen carriers *Ovary* of 2 carpels, style connate above, style apex 5 angled tip rounded *Fruit* of 1 (or 2) long acuminate slender, follicular monicarp testa thin, smooth *Seeds* small flat, winged, newly orbicular, comose albumen scanty, cotyledons small, ovate radicle cylindric DISTRIB One species, Malay Peninsula and Philippine Islands

ISCHNOSTEMMA SELANGORICA, King & Gamble, n. sp. A slender twining greyish undershrub, branchlets slender, terete *Leaves* membranous, variable ovate lanceolate obovate or oblanceolate, mucronate at apex, attenuate at base glabrous and pale green on both surfaces, 1 to 1.75 in long, 5 to 75 in broad, midrib broad, flattened, main nerves 4 to 6 pairs, very faint, curving upwards to meet in a faint intramarginal nerve reticulations obscure, petiole slender, 25 to 5 in long

*Umbels* usually 3- to 5-flowered, peduncles 75 in long, bracts minute, subulate, pedicels filiform, 5 to 75 in long, bud, conical flower yellow. *Calyx* cleft to the base, lobes lanceolate, acuminate, 1 in long. *Corolla*-tube very short lobes lanceolate, acuminate, 2 in long. *Corona* processes acuminate, erect, longer than the column. *Style*-apex hemispheric at tip. *Follicles* lanceolate long acuminate, 25 in long, 25 in broad, testa thin, smooth. *Seeds* flattened, nearly orbicular, 175 in long, 1 in broad, broadly winged, testa brown, thin, slightly granular, embryo very small, 03 in long in all.

SELANGOR at Kuala Selangor, in mangrove swamps, Ridley 7564  
 DISTRIBUTION Philippine Islands, in Central Luzon (Lohr 4039, 4040)

# 17 CYNANCHUM Linn

Herbs or shrubs, erect or twining. *Leaves* opposite. *Flowers* small in sessile or pedunculate corymbose or umbellate cymes or racemes subaxillary or lateral between the bases of the petioles. *Calyx* 5 partite with 5 to 10 glandular scales within or eglandular. *Corolla* deeply 5 fid, rotate or campanulate lobes slightly overlapping to the right in bud, more or less twisted. *Corona* arising from the staminal column at or near the base often membranous annular cupular or tubular toothed or lobed at the top or divided more or less deeply into entire or toothed processes. *Staminal column* arising at or near the base of the corolla filament part varying from none to rather long and slender anthers hardened appendages membranous, erect or flexed over the style apex pollen masses 1 in each cell oblong not compressed, pendulous, attached by a caudicle to the rather large horny pollen carriers. *Ovary* of 2 carpels styles free below style apex 5 lobed truncate, conical or rotate. *Fruit* of 2 smooth follicular mericarps winged or entire sometimes with tubercular processes. *Seeds* plano convex, tipped with a silky coma. *DISTRIBUTION* Cosmopolitan species about 100

Leaves ovate or oblong not cordate at base peduncles short, follicles smooth

1 (*ovalifolium*)

Leaves ovate deeply cordate at base peduncles long follicles with soft hooked spines

2 (*corymbosum*)

1 CYNANCHUM OVALIFOLIUM, Wight Contrib 57 (1834) A nearly glabrous, small twining shrub, branchlets very slender, terete, pale brown. *Leaves* membranous, ovate or oblong, acuminate at apex, rounded or subacute at base, often furnished with one or two small axillary, unequal-sided leaflets at the base of the petiole, both surfaces glabrous, lower pale, margins slightly recurved 3 to 45 in long, 125

to 2 in broad, the axillary leaflets about 5 in long, midrib rather broad, channelled above, main nerves 7 to 8 pairs, at first straight, then curved upwards to form a looped intramarginal nerve near the edge, secondary nerves few, reticulations few, obscure, petiole 5 to 75 in long, articulate near the base, the upper side channelled and with a line of hairs, the base enlarged, those of each pair forming a cup round the branchlet *Cymes* lateral, between the leaves, about 4-to 8-flowered, racemose, peduncle 5 to 75 in long, pedicels 1 to 15 in long, puberulous, bracts small, obtuse, flower-buds spherical *Calyx*-lobes ovate, 95 in long, glandular scales 5, minute, alternate with the lobes *Corolla* cleft nearly to the base, lobes concave, obtuse, 15 in long *Corona* membranous, 1 to 15 in deep, cylindric, divided above into 10 or more irregular teeth *Staminal column* rather long, wings horny, sagittate at base, appendages membranous rounded, crenate, erect or slightly curved over the style apex, pollen masses ellipsoid, waxy, attached by clavate caudicles to the rather large black pollen-carriers *Style-apex* 5 angled, depressed, with a small rounded tip *Follicles* usually 1 only, thickly coriaceous, nearly straight on the dorsal, curved on the ventral edge, 3 to 5 in long by 75 to 1 in broad, tip recurved-hooked, base slightly gibbous, pericarp smooth *Seeds* nearly orbicular, plano convex, broadly winged, 3 to 35 in long, 25 in broad, ending in a broad tip which bears a white silky coma 15 in long testa thin, granular and wrinkled, dark brown, cotyledons ovate, obtuse, 1 in by 075 in, radicle cylindric, 05 in long Wall Cat 8226 Hook f Fl Br Ind IV 23 *Cynoctonum ovalifolium*, Dene in DC Prodr VIII 529, Miq Fl Ind Bat II 479

PENANG Wallich 8226, Curtis 871, 1270 PROVINCE WELLESLEY on the road to Alakuda, Ridley 7029 PERAK Wray 1763, 2061, 2939, King's Collector, 2575, 8385, 8450, *Scortecluni* 789 MALACCA Murray (K D) 1140 SINGAPORE Ridley 10160—DISTRIB Java

2 CYNANCHUM (ORYMBOSUM, Wight Contrib 56 (1834) A slender climbing shrub, stem rather stout branchlets terete, glabrous, with rather long internodes *Leaves* membranous when dry, dull green when fresh ovate or orbicular, cuspidately acuminate at apex, cordate at base with a sinus 4 in deep, 5 in broad under surface pale, glaucous, upper surface glabrous except the midrib and main nerves, margins slightly recurved, 2 to 6 in long, 1 to 3 in broad, midrib slender, raised beneath, furnished at the base with a tuft of minute glands, main nerves 5 to 6 pairs, the lowest 3 pairs spreading from opposite the gland-tuft, the rest curved upwards to near the margin, reticulations rather scanty, chiefly transverse petiole 15 to 3 in long, slender *Cymes* corymbiform, many flowered, 2 to 3 in long, glabrous

peduncle slender about 15 in long bracts minute, subulate pedicels slender 5 in long huds ovoid *Calyx* deeply cleft lobes ovate, acute, hyaline on the margins 05 in long scales obscure *Corolla* campanulate tube very short lobes erect oblong obtuse 15 in long margins usually somewhat reflexed *Corona* as long as corolla lobes campanulate irregularly crenately 10 or more lobed with 10 internal longitudinal folds *Staminal column* inserted at the base of the corolla tube anther wings broad, horny cells pocket like appendages ovate acute pollen masses ellipsoid attached by short clavate caudicles to the small oblong pollen carriers *Style apex* 5 angled tip acuminate bifid *Stillicules* 1 or 2 reddish lanceolate long acuminate 3 to 5 in long 1 to 15 in broad pericarp thick densely clothed with soft reversed hooked spines 25 to 5 in long *Seeds* orbicula ovoid 5 in long and nearly as broad wrinkled broadly winged deeply dentate crenate at the lower end tip truncate crowned with a 1 to 15 in long white silky coma testa dark brown shining rugose on the dorsal face cotyledons elliptic 15 in long radicle cylindric acute 075 in long Wall Cit 8222 8231 Hook f Fl Br Ind IV 24 (*Gnaphalium corymbosum* DC in DC Prodr VIII 528)

PENANG *Hallich* PLANK on shrubs at 300 to 500 ft *Kings Collect* 5301 *Scurruchin* DISTRI India (Sikkim Assam Sylhet Cooch Bihar Islands)

#### TYPE IV MARSDENIA

Stamens with filaments connate into a tube anthers erect or incumbant on the style apex and adnate to it at their base with flat or inflated membranous appendages Pollen contents of each anther cell united into a waxy mass pollen masses opaque without a pollinoid margin attached in pairs to the pollen carriers by long or short caudicles erect or ascending or horizontal never entirely pendulous sometimes very minute and the caudicles very slender pollen carriers hrd and horny with a dorsal suture usually dark coloured

Corolla lobes overlapping (sometimes valvate or nearly so in *Gongronema*) —

- |  |               |
|--|---------------|
| Corona none  | 18 SARCOLOBIS |
| Corona corolline                                       | '             |
| Corolla lobes long, style apex included herbs          | 19 PENTASCEPH |
| Corolla lobes short style apex exserted twining shrubs | 20 GYMELMA    |
| Corona staminal rarely none                            |               |
| Corolla urceolate or campanulate sometimes rotate      |               |
| Corona processes fleshy rounded                        | 21 GONGRONEMA |



- Corona processes fleshy or membranous, with one or sometimes two apical teeth, sometimes none 22 MABSDANIA
- Corolla hypocrateriform —
- Corolla small or moderate sized, corona processes compressed, beaked .. 23 PERGULARIA
- Corolla large, corona processes none or flattened 24 STEPHANOTIS
- Corolla rotate or rotate campanulate, corona processes small on the filament part of the column 25 TYLOPHORA
- Corolla lobes valvate —
- Corolla rotate or subcampanulate —
- Corona processes spreading, lower lobes usually dentate or lacinate, upper lobes tubercular or absent, leaves not fleshy, climbing shrubs 26 HETEROSTEMMA
- Corona stellate lower lobes erect or spreading upper beaked, leaves usually fleshy, epiphytes or epiphytic climbers .. 27 HOYA
- Corolla urceolate or cylindric or campanulate, corona processes very membranous, epiphytes 28 DISCHIDIA
- Corolla tube short, lobes long subulate, twining under shrub .. 29 PYNONIACHIS

## 18 SARCOLOBUS, B.

Twining glabrous shrubs *Leaves* opposite *Flowers* small, in crowded, pedunculate, axillary or interpetiolar corymbiform cymes (alyx 5 partite, with 5 minute glandular scales at the base within) *Corolla* campanulate or subrotate, 5 fid the lobes overlapping to the right *Corona* none *Stamens* affixed to the base of the corolla, filaments connate in a short tube anthers broad ending in a spathulate inflexed appendage pollen masses solitary in each cell erect compressed, obovate, attached by long filiform twisted caudicles to the narrow, long channelled pollen carriers *Ovary* of 2 distinct carpels, styles distinct below ending above in a 5 angled style apex with flat or slightly rounded tip *Fruit* of usually 1 thick globose and smooth or ovate and 2 keeled follicular mericarp pericarp fleshy, chartaceous when dry *Seeds* large, marginate, without coma — **DISTRIB** Species 3 two of India, the Malay Peninsula and the Andaman and Nicobar Islands the third of Java

SARCOLOBUS GLOBOSUS, Wall in Asiatic Research XII 577, t 4 (1818), and Cat 4468 A twining shrub branchlets slender, smooth, shining, callose punctate, pale brown *Leaves* thinly coriaceous, oblong or ovate oblong, acute or shortly acuminate at apex, rounded at base and usually somewhat unequal sided both surfaces brown when dry, lower glaucous, young leaves slightly pubescent, margins slightly recurved 3 to 4.5 in long, 1 to 1.75 in broad, midrib slender, channelled above and furnished with a small cluster of glands at the base,

raised on the lower surface, main nerves 5 to 7 pairs, broadly arched to meet in a looped intramarginal nerve rather far from the edge, reticulations irregular, chiefly transverse, petiole slender, 5 to 1 in long, channelled and puberulous on the upper surface. *Cymes* many-flowered, slightly puberulous, peduncles 5 to 75 in long, thickened at top below the corymbs, pedicels 25 in long, slender, bracts small, triangular, buds broadly ovoid. *Calyx* lobes scarious, ovate, obtuse, 0.5 to 1 in long, scales minute, 5 to 10. *Corolla*-lobes nearly orbicular, pubescent within, 2 in long, pale purple. *Anthers* slightly auricled, appendages much incurved. *Style* apex 5 lobed with a rounded tip. *Follicle* globose, retuse at apex and base, 4 in in diam. pericarp very thick, with many raised dots. *Seeds* broadly obovate, flat with a raised border apiculate, 7 to 1 in long, coma none, testa dark brown, cotyledons obovate, retuse at apex, radicle small. Wight Contrib 47, and Ic t 1273. Dene in DC Prodr VIII 625, Hook f Fl Br Ind IV 27. Plain Beng Plants 693. *S. carinatus*, Griff Notul IV 53, and in Ic Pl Asiat t 410 (not of Wall).

PERAK *Scortechini* 127, 1393. *Kings Collector* 1028, 1162. MALACCA (*Giffith* 377). SINGAPORE *Hullett* 32, 648. *Ridley* 5715. DISTRIB India (Salt Lakes, Calcutta *C B Clarke*), Burma (Mergui *Giffith*), Borneo (*Hamland*). A plant of the banks of salt river-creek.

#### 19 PLANTASACME, Wall

Tufted erect glabrous herbs with slender simple stems and many tiny roots rooting on rocks. *Leaves* opposite, membranous, narrow. *Flowers* yellowish or white, small, in short axillary umbelliform or racemose cymes. pedicels capillary. *Calyx* 5-partite, with 5 glandular scales within. *Corolla* tube short, campanulate, lobes narrow, caudate, twisted, overlapping to the right in bud. *Corona* processes 5, on the corolla tube, entire or toothed. *Staminal column* very short, anther-appendages membranous, pollen masses 1 in each cell, erect, ovoid, waxy, attached near the middle by a slender caudicle to an oblong pollen carrier. *Ovary* of 2 carpels, style short, style-apex 5-angled, conical or beaked at apex. *Fruit* of 1 slender terete follicle, straight, pericarp thin, smooth. *Seeds* oblong spatulate, not or very slightly winged, convex on both surfaces, cotyledons ovate, radicle cylindric. — DISTRIB Species 3 or 4, two of India and Malaya, the other Chinese.

PLANTASACME CAUDATUM, Wall Cat 8234 (1829). A tufted erect glabrous herb, stems simple, many, slender, 12 to 18 in long, pale brown, terete, 1 in in diam, roots many, slender, twisted, spreading. *Leaves* membranous, linear lanceolate, long caudate acuminate at apex, narrowed at base, pale on both surfaces when dry, under surface

glaucous, 2 to 4 in long, 2 to 4 in broad, midrib slender, prominent main nerves about 12 pairs, obscure, acutely curving upwards to meet an intramarginal slightly-looped nerve, reticulations hardly visible, petiole none or up to 1 in long, stem clasping at base. *Cymes* racemose, 1- to 6-flowered, very short, peduncles very short, pedicels capillary, 2 to 25 in long, bracts minute, flowers white, buds conical. *Calyx*-lobes ovate-lanceolate, acuminate, 0.6 in long, glands dark. *Corolla*-lobes caudate acuminate from a broad base, 2.5 in long, tip obtuse. *Corona* processes short, obscurely 4 lobed behind, lobes with several short obtuse teeth in front. *Follicles* 1.75 to 3 in long, very slender, straight pericarp thin. *Seeds* ovate spatulate, with a minute wing near the base, concave, 1.5 in long, tip obliquely truncate with a white silky coma 5 to 7.5 in long. *testa* thin, brown, papillose. *cotyledons* ovate, 0.5 in long. *radicle* cylindrical 0.25 in long. *Wight Contrib* 60, *Dene in DC Prodr VIII* 627. *Miq Fl Ind Bat II* 501. *Hook f Fl Br Ind IV* 28. *Spiladocorys angustifolia* Ridley in *Trans Linn Soc Ser 2 III* 322, t 63.

**PERAK** growing on rocks in the beds of streams. *Curtis Ridley* 2885. *Scortechini* 1310, *Wray* 1980. *King's Collector* 10685. **PAHANG** on Tahan river, *Ridley* 2589. — **DISTRIB** India (Khasia Hills, Patkoi Hills, and Sylhet), Burma.

## 20 GYMNEMA, B1

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small in crowded sublateral or opposite umbelliform cymes. *Calyx* 5 partite, eglandular or with 5 to 10 glandular scales at the base within. *Corolla* subrotate, campanulate or urceolate, 5 fid, lobes thick, narrowly overlapping to the right in bud or subvalvate. *Corona* processes 5, arising from and adnate to the corolla tube, either of 5 fleshy lobes adnate up to the mouth of the corolla-tube with more or less free incurved points, or of 5 pairs of fleshy ridges on the lower part of the tube, alternating with the corolla lobes. *Staminal-column* arising from the base of the corolla, anthers short, erect, with short membranous appendages. *pollen-masses* erect, attached to the pollen carriers by very short caudicles. *Ovary* of 2 carpels, styles free to near the top, style apex large, conical, clavate or capitate, exserted beyond the anthers. *Fruit* of 2 (or 1) smooth follicular mericarps. *Seeds* comose. — **DISTRIB** About 20 species, chiefly Asiatic, two extending to Central Africa, others to Australia.

Corolla tube short, with corona processes of 5 fleshy villous lobes on the throat the free points exserted in the sinuses —

Leaves 3 to 6 in long tawny pubescent beneath, cymes subcapitate shortly peduncled.

1 *G. acuminatum*

Leaves 2 to 4 in long, nearly glabrous, cymes umbellate, peduncled .. ..	2 <i>G. lactiferum</i> var <i>nitens</i>
Leaves 1 to 2 in long, tawny pubescent, cymes subsessile	3 <i>G. Mangay</i>
Corolla tube elongate, with corona processes consisting of villous ridges in the lower part of the tube, but no free points in the sinuses, leaves 2.5 to 6 in long ..	4 <i>G. tingens</i>

1 *GYMNEMA ACUMINATUM*, Wall Tent Fl Nap 50 (1826), Cat 8187  
A large twining shrub with corky bark, branchlets softly tawny-pubescent. *Leaves* coriaceous, ovate or ovate elliptic, acuminate at apex, rounded at base upper surface glabrous, lower tawny pubescent, margin slightly recurved, 3 to 6 in long, 1.75 to 2.25 in broad midrib stout, main nerves 4 to 6 pairs, curved upwards to anastomose near the margin, reticulations in a prominent network petiole 5 in long. *Cymes* in pairs many flowered, subcapitate, tawny pubescent, peduncle as long as or shorter than the petiole, pedicels very short. *Calyx* lobes ovate-acute, .05 in long, pubescent without, scales very small. *Corolla* lobes rounded, the tips incurved, .075 to 1 in long glabrous. *Corona* of rounded incurved processes alternate with the corolla lobes with bearded short ridges below them half way down the tube. *Anthers* short, appendages erect, rounded membranous pollen masses oblong, attached to the pollen carriers by very short or almost no caudicles. *Style-apex* fleshy, globose conical. *Follicles* 3 in long, ovoid turgid, beaked, woody, cordate at base, pericarp glabrous. *Seeds* large 7 in long, flat, elliptic, broadly winged, the wing membranous. Wight Contrib 45. Dene in DC Prodr VIII 622 Miq Fl Ind Bat II 499 Hook f Fl Br Ind IV 30, Plain Beng Plants 694. *Gynanchum acuminatum*, Herb Ham. *Asclepias acuminata*, Roxb Hort Beng 21, and Fl Ind II 55.

KEDAH Langkawi Island, *Curtis* 2811 MALACCA *Griffith Mangay* (k D) 1109—DISTRIB India (Eastern Bengal and Chittagong), Burma, Java

2 *GYMNEMA LACTIFERUM*, Bt in Mem Wern Soc Edinb I 33 (1808), Wight Contrib 44, Dene in DC Prodr VIII 622 Hook f Fl Br Ind IV 30, Trimen Fl Ceyl III 154. *G. zeylanicum*, Dene in DC l c. *Asclepias lactifera*, Linn Sp Pl 216

VAR *nitens*, Hook f Fl Br Ind IV 31. A twining shrub, branchlets smooth, dark brown, glabrous, the uppermost pubescent. *Leaves* membranous when dry and reddish brown, ovate-lanceolate, acuminate at apex, acute at base, glabrous on both surfaces or the midrib and nerves beneath pubescent, margins recurved, 2 to 4 in long, .75 to 1.5 in broad, midrib slender, main nerves about 6 pairs, curving acutely upwards to an irregular intramarginal nerve, not prominent reticula.

tions faint, petiole slender, 3 to 4 in long. *Cymes* in pairs, opposite, alternate with the leaves, minutely pubescent, umbels racemose, with minute persistent bracts 10- to 12-flowered, peduncles 25 in. long; pedicels slender, 1 to 15 in long, buds ovoid. *Calyx*-lobes ovate with scarious margins, 05 in. long, glands 5, subulate, black. *Corolla* .075 in. long, lobes as long as tube, rounded. *Corona* of 5 pairs of bearded ridges on the corolla-tube alternate with the lobes, and with small rounded incurved tips. *Anther*-appendages rounded, minutely erose, pollen-masses spatulate, connected by short jointed rounded caudicles to the oblong pollen-carriers. *Style*-apex globose. *Fruit* not seen. *G. nitens*, Blume Mus Bot I 149, t 29, Miq. Fl. Ind Bat. II 498. *G. Malayanum*, (Griff. Notul IV 56, and Ic Pl Asiat t 394.

PENANG *Curtis*. PERAK *Scortechum* 2007. MALACCA. *Maingay* (K.D.) 1110.—DISTRIB. Sumatra, Borneo (*Motley* 383).

3. *GYMNEMA MAINGAYI*, Hook f. Fl. Br. Ind IV 31 (1883). A slender much twining undershrub, branchlets finely tawny-pubescent, the bark papery. *Leaves* membranous when dry, ovate-acuminate at apex, cordate at base, both surfaces pubescent, the hairs with bulbous bases, yellow when dry, margins slightly recurved, 1 to 2 in long, 75 to 1 in. broad, midrib prominent, unpressed above, sometimes with a small gland at the base, main nerves 4 to 5 pairs arching upwards and anastomosing near the margin, reticulations not easily visible, petiole .125 to 25 in. long, curved, easily detached at the base. *Cymes* subsessile, pubescent, the peduncle when present short, thickened, pedicels slender, 1 to 2 in long, bracts most minute, buds oblong-conical. *Calyx* deeply cleft, pubescent without, lobes oblong, obtuse, 05 in long, scales invisible. *Corolla* campanulate, tube 075 in long, lobes ovate, 025 in. long, glabrous, thickened. *Corona* of small fleshy obtuse scales in the sinuses of the corolla-lobes, and a decurrent hairy ridge below extending about half-way down the tube. *Staminal-column* columnar, anther-wings long, appendages rounded, short, scarious, pollen-masses clavate, connected by very short jointed caudicles to the nearly globose pollen-carriers. *Style*-apex dome-shaped, much exceeding the anthers. *Fruit* not known.

MALACCA. *Maingay* (K.D.) 1111.

4. *GYMNEMA TINGENS*, Wight Contrib. 45 (1834). A slender climbing shrub, branchlets dark brown, slender, smooth, somewhat thickened at the nodes. *Leaves* membranous when dry, ovate-acuminate at apex, rounded shallowly cordate or (when young) slightly cuneate at base, both surfaces glabrous, olive-green when dry; margins slightly recurved, 2.5 to 6 in. long, 1 to 3 in broad, midrib slender, raised beneath, main nerves 5 to 8 pairs, the lowest 2 to 3 pairs rather close

together and more spreading than the rest reticulations many, obscure petiole slender, 75 to 15 in long, channelled above Cymes as long as or shorter than the petioles, axillary between the leaves, puberulous, peduncles slender, 5 to 75 in long branches few, short, much thickened, bracteate, bearing spirally racemose many flowered umbels, pedicels capillary, 5 in long buds conical, flowers pale yellow Calyx-lobes oblong, 15 to 2 in long, ciliate glands 5, very small Corolla tube 1 in long, pubescent within lobes 15 in long, narrowly oblong, obtuse, glabrous Corona of thickened hispidly bearded broad ridges inside the corolla tube a little way below the sinuses of the lobes, no free scales at the sinuses Staminal-column slender, 15 in long, appendages ovate, membranous, erect pollen masses oblong-clavate, attached to the ovoid pollen carriers by very short clavate caudicles Style apiculate longate, clavate much exceeding the anther column Follicles solitary, slender, straight or very slightly curved, 5 to 6 in long, 4 to 5 in broad, point acuminate pericarp smooth, ribbed Seeds elliptic, flat, 5 in long, 3 in broad, with a broad wing, base obtuse, apex slightly produced and truncate surmounted by a white silky coma 15 in long testa thin, dark brown cotyledons elliptic 15 in long, radicle cylindrical, 075 in long Wall Cat 8190 Hook f Fl Br Ind IV 31 Prain Beng Plants 694 *G. tingens* var *condifolia*, Wight Ic t 593 *Lidaria tingens*, Dene in DC Prodr VIII 623, partly *Isclapras tingens* Roxb Hort Beng 21, and Fl Ind II 53

PEERAK at Ulu Buhong, 400 to 600 feet, clinging to large trees, King's Collector 10242 at Chandriang under 300 feet, ib 5747  
DISTRIB India, Burma

## 21 GONGRONEMA, Dene

Twining shrubs or undershrubs Leaves opposite Flowers small, in sessile or pedunculate or branching cymes, often umbelliform, in one of the axils of a pair of leaves, often with thickened tuberculate bracteate rachises (as in *Hoya*) Calyx 5 partite, glandular or eglandular within Corolla unceolate subrotate or broadly campanulate the lobes narrowly overlapping to the right (valvate in *G. Wiayi*) Corona-processes 5, adnate to the staminal-column near the base, usually small and rounded, sometimes large, erect Staminal column inserted at the base of the corolla, short, anther-appendages membranous, inflexed over the style-apex, pollen-masses solitary in each cell, erect, ovoid, waxy, attached by slender curved caudicles to rather large ellipsoid pollen-carriers Ovary of 2 carpels, style short, style apex conical or convex Fruit of 2 (more usually 1) smooth, acuminate follicular mericarps Seeds comose —DISTRIB Species about 10, Asiatic, African, and Australian

Corolla urceolate, cymes shorter than the petioles; corona rounded, more or less adherent to the staminal-column.—

Leaves rounded at base; caudicles of pollinia curved, slender 1. *G. Wallichii*

Leaves cordate at base, caudicles of pollinia clavate .. 2. *G. Curtisii*

Corolla campanulate, cymes longer than the petioles, corona ligulate, angularly bent upwards, caudicles slender, straight .. 3. *G. bracteolatum*

Corolla campanulate, almost hypocrateriform, cymes shorter than the petioles, corona dorsally flattened below, radically flattened above, caudicles long, much curved .. 4. *G. Wrayi*.

1 GONGRONEMA WALLICHII, Dcne in DC Prodr VIII 624 (1844)  
A small twining shrub, branchlets slender, pale brown, smooth. Leaves finely membranous, elliptic-oblong or -lanceolate, shortly acuminate at apex, rounded at base, both surfaces glabrous, the lower paler, margins slightly recurved, 3 to 6 in long, 1 to 2 in broad, midrib slender impressed above, raised beneath, with a small tuft of glands at the base just above the petiole, main nerves 5 to 6 pairs, arched upwards to meet in a prominent intramarginal looped nerve, secondary nerves and reticulations few, irregular, petiole 5 to 7.5 in long, slender, twisted. Cymes subsessile, racemiform, few flowered, shorter than the petioles, on a stout rachis tuberculate with many persistent small rounded imbricate bracts, pedicels slender, 1 to 1.5 in long, buds globose. Calyx-lobes ovate-acute, scarious, 0.5 in long, scales 5, minute. Corolla urceolate, tube 1 in long, nearly globose, minutely hairy within, teeth acuminate, erect or spreading, 0.5 in long. Corona-processes broad, somewhat incurved, rounded at the tip from a broad base, adherent to the base of the staminal-column, fleshy. Staminal column short, appendages membranous, acuminate, pollen masses oblong ovoid, attached by slender curved caudicles to the ovoid pollen carriers. Style-apex shortly 5 lobed, with a conical apiculus. Follicles slender, straight or gently curved, linear-lanceolate, acuminate, 6 in long, 3 to 4 in broad, pericarp smooth. Seeds ovate, spatulate, flattened, 3 to 3.5 in long, twisted, with a broad wing. Miq Fl Ind Bat II 500, Hook f Fl Br Ind IV 33. *Gymnema Wallichii*, Wight Contrib 46, Wall Cat 8195A.

PROVINCE WELLESLEY Ridley 7029 MALACCA Griffith (K D) 3770, Maingay (K D) 1113.—DISTRIB Borneo (Haviland 3503)

2 GONGRONEMA CURTISII, King & Gamble, n sp. A slender small twining shrub, branchlets pale brown, slender, smooth, innovations tawny-pubescent. Leaves membranous when dry, elliptic-lanceolate or -obovate, broadly acuminate at apex, shortly cordate at base, tawny-pubescent on both surfaces when young, glabrescent when older, except on the margins and midrib, under surface pale grey, 2.5 to 3 in long, 7.5 to 1.5 in broad, midrib broad, prominent beneath, with

a small glandular tuft at the base just above the petiole; main nerves 5 to 6 pairs, very faint, curved upwards to a faint intramarginal nerve, reticulations not distinguishable, petiole slender, .5 to .75 in. long, twisted at base. *Cymes* shorter than the petioles, pubescent, sessile or very shortly pedunculate, 2-flowered with a thickened bracteate rachis, pedicels slender, .05 to 1 in long, buds globose-conical, flowers pale green. *Calyx*-lobes ovate-acute, pubescent, ciliate, .075 in long, scales about 10. *Corolla* urceolate, tube .15 in long, pubescent within, lobes oblong, acute, spreading, twisted, 1 in long. *Corona*-processes rounded, curved downwards, attached to the base of the anthers, columnar, fleshy. *Anthers* short, appendages erect, membranous, triangular-ovate, pollen-masses oblong-ovoid, waxy, attached by slender slightly clavate caudicles to the rather large ovate pollen-carriers. *Style-apex* of a 5-lobed flattened ring, surrounded by a large rounded conical apiculus. *Fruit* not known.

PENANG on West Hill at 2000 ft, *Curtis* 1545. PERAK at Lower Camp Gunong Batu Patch, *Wray* 1011.

3. *GONGRONEMA BRACTEOLATUM*, King & Gamble, n sp. A small twining shrub, branchlets rather stout, brown, uppermost minutely puberulous. *Leaves* coriaceous, oblong-lanceolate, acuminate at apex, cordate at base, when young puberulous, when old glabrescent, except on the midrib, margins recurved, 3 to 6 in long, 1.25 to 1.75 in broad, midrib rather stout, keeled above, furnished with a tuft of small glands at the base just above the petiole, main nerves 6 to 7 pairs, acutely curving upwards to join in a looped intramarginal nerve, reticulations obscure, petiole .75 to 1 in long, curved. *Cymes* longer than the petioles, racemose, on .5 to .75 in. long, thickened, many-bracted rachises at the ends of the peduncles, peduncles thick, woody, .5 in long, pedicels 1.5 to 2 in. long, bracts ovate-acute, buds conical, flowers yellow. *Calyx*-lobes ovate-acute, glandular, ciliate, scarious, .05 in long, scales 10, minute. *Corolla* campanulate, broad, tube 1 in long, pubescent within, lobes triangular, ovate-acute, spreading, .15 in long. *Corona*-processes attached to the back of the staminal-column at its lower part, thick, fleshy, ligulate, bent in the middle and curving over the top of the staminal-column and style-apex. *Anthers* with a short, membranous, acuminate, incurved appendage, pollen-masses ovoid, attached by slender straight caudicles to the rather large pollen-carriers. *Style-apex* annular, obscurely 5-lobed, the apiculus convex. *Fruit* not known.

PERAK. at Gopang, *King's Collector* 721.

4. *GONGRONEMA WRAYI*, King & Gamble, n sp. A slender twining undershrub, branchlets terete, yellowish, very flexuous. *Leaves* coriaceous, bright green, ovate, bluntly acuminate at apex, rounded and



almost cordate at base, both surfaces glabrous, shining, margins recurved, 2.5 to 4 in long, 1 to 1.75 in broad, midrib stout, impressed above, raised beneath, with a large gland at its base, main nerves 5 to 7 pairs, at about  $70^\circ$  with the midrib, nearly straight at first, then often branched, joining an irregular looped intramarginal nerve, secondary nerves many, similar, but not meeting the sinuses of the intramarginal nerve, reticulations irregular, usually branched towards the midrib, petiole slender, 5 to 7.5 in long. *Cymes* axillary, umbellate, about 5- to 6 flowered, shorter than the petioles, peduncle thick, about 1 in long. *Bracts* triangular, small. *Pedicels* 1 in long, puberulous. *Flower buds* conical. *Flowers* yellow. *Calyx* cup shaped, pubescent without lobes orbicular ciliate, 0.75 in long. *Scales* minute. *Corolla* thick, campanulate almost hypocrateriform tube cylindric, 1.5 to 2 in long, glabrous on both surfaces. *Lobes* triangular, valvate, stellately spreading, nearly as long as tube. *Corona* of 5 erect processes adnate to the backs of the anthers, very fleshy, ovate glabrous dorsally flattened and concave below radially flattened and rounded at apex much longer than the staminal column. *Staminal column* short filament tube nearly free from the corona. *Anther cells* parallel appendages scarious, ovate-acute, incurved over the style apex, pollen masses ellipsoid, granular, attached by very slender long curving caudicles to the small conical pollen-carriers. *Style-apex* 5 angled, thick, depressed, with a conical apex. *Fruit* not known.

PERAK at Relun Tujor Wray 2243

## 22 MARSDENIA, Bl

Climbing rarely erect shrubs or undershrubs. *Leaves* opposite. *Flowers* small or of moderate size in umbelliform cymes or in small sessile umbels or clusters scattered along the branches of the cymes or of panicles, which are lateral at the nodes or axillary. *Calyx* 5 partite with 5 to many glandular scales at the base within, sometimes eglandular. *Corolla* campanulate or urceolate lobes 5 overlapping to the right. *Corona* processes 5, membranous or fleshy, arising from the staminal column, the basal part adnate to it, the apical part free, often of two lobes one above the other. *Staminal column* arising from or near to the base of the corolla. *Anthers* erect, with membranous appendages more or less incumbent over the style apex. *Pollen masses* erect, solitary in each anther cell, oblong, waxy, attached in pairs by moderately stout caudicles to the ovate horny pollen-carriers. *Ovary* of 2 carpels, style short. *Style apex* large, usually more or less hollowed above and then expanding into a convex or conical or depressed tip. *Fruit* of 2 (more usually 1 only by abortion) lanceolate or ponaud

shaped follicular mericarps, pericarp thick, smooth or wrinkled, or sometimes winged. *Seeds* comose.—*DISTRIB* About 70 species in the tropics of both hemispheres, one South European

Plant turning blue in drying, flowers small, in clusters in a thyrsoid panicle, corolla campanulate, lobes short with tufts of hair at the mouth, corona processes subulate acuminate, longer than the anthers

.. 1 *M. tinctoria*

Plant brown when dry, flowers in pedunculate corymbose cymes, corolla tubular campanulate, lobes linear glabrous, corona processes 2 lobed, outer flattened inner acute shorter than the anthers

2 *M. Scottichinii*

Plant greenish brown when dry, flowers in clusters in a long spike or raceme corolla urceolate lobes lanceolate, corona processes none or small and then adnate to the anthers

3 *M. thyrsoflora*

Plant greyish when dry, flowers in pedunculate umbels corolla rotate lobes broadly rounded corona processes large round fleshy with an acute beak shorter than or equal to the anthers

4 *M. volubilis*

1 *MARSDENIA TINCTORIA* B. in Mem Wern Soc Edinb I 30 (1808)  
A climbing shrub stem stout smooth, branchlets slender, smooth, uppermost pubescent, the whole plant when dry having a bluish black tinge. *Leaves* membranous when dry ovate or ovate oblong shortly and abruptly acuminate sometimes long caudate acuminate at apex, rounded or cordate at base both surfaces finely pubescent when young, afterwards glabrous 3 to 9 in long 1 to 3 in broad midrib slender, usually pubescent furnished above at the base and partly on the petiole with a group or string of small glands main nerves 7 to 8 pairs not conspicuous straight or slightly curved usually at about 50° with the midrib reticulations transverse slender obscure petiole slender puberulous .75 to 1.25 and even 2 in long twisted and curved in the middle. *Cymes* in densely flowered interrupted clusters along or on the branches of a thyrsoid panicle reaching 3 to 6 in in length and 5 to 1 in in diam, grey puberulous peduncles .5 to 1.5 in long pedicels slender .15 in long buds ovate flowers yellow, blue when dry. *Calyx* lobes ovate, pubescent without, ciliate, 3 to 5 nerved, membranous, .05 in long, glandular scales 5 minute. *Corolla* cylindric campanulate tube slightly constricted at mouth, furnished within with 5 lines of retroscissile stiff hairs .075 in long lobes rounded erect or spreading in flower, .025 to .05 in long, each furnished within with a tuft of stiff bristles. *Corona* processes membranous, the apex subulate acuminate longer than the anthers. *Anthers* with membranous incurved appendages pollen-masses oblong, attached by long somewhat clavate

caudicles to the rather small pollen-carrier *Style-apex* annular, 5-rayed the top depressed with a very short umbo *Follicle* 1, pendulous, linear-lanceolate, 3 in long, 5 in in diam, somewhat gibbous at base, acuminate and slightly hooked at tip, pericarp pubescent *Seeds* compressed, ovate, shortly beaked, 5 in long, 25 in broad, with a narrow wing Wight Contrib 40, and Icones t 519, Wall Cat 8173, Griff Notul IV. 52, and Ic Pl Asiat t 389, Dene in DC Prodr VIII 615, Miq Fl Ind Bat II 491, Hook f Fl Br Ind IV 34, Brandis For Fl 332, Kurz For Fl II 201 Praem Beng Plants 696 *M. monostachya*, Wall MSS *Asclepias tinctoria*, Roxb Hort Beng 20, and Fl Ind II 43 *Pergularia tinctoria* Spreng Syst I 844 *P. parviflora*, Blume Bijdr 1056 *Cynanchum tingen*s, Hort Ham

KEDAH King's Collector 1731 PERAK Ridley 9672 (in very young fruit and in some respects slightly different looking), *Scortechini* 1299 —DISTRIB India (Sikkim, Assam, and E Bengal), Burma, Sumatra, Java, Borneo, China

The description of the fruit requires verification for the Malay Peninsula

2 *MARSDENIA SCORTECHINII*, King & Gamble, n sp A twining shrub, branchlets very slender, pale brown *Leaves* membranous when dry, ovate, long acuminate at apex, rounded or cordate at base, both surfaces slightly puberulous when young, afterwards glabrous, brown when dry 2 to 3 in long, 1 to 1.5 in broad, midrib slender, with a tuft of small glands at the base above the petiole, main nerves 5 to 7 pairs, curving upwards to anastomose near the margin, reticulations many, transverse and netted, petiole slender, 5 to 1 in long, twisted *Cymes* axillary between the petioles, pedunculate, corymbose, puberulous, about 1 in long and broad peduncles 5 in long flowers very many buds conical acuminate pedicels 15 in long, bracts ovate acuminate *Calyx* lobes oblong acute, membranous, ciliate 1 in long scales 5 minute *Corolla* tubular campanulate, tube 1 in long, glabrous within lobes linear oblong, 15 in long, glabrous *Corona* processes membranous, broad outer lobe flattened, rounded inner erect, acute, shorter than the anther column *Anthers* with prominent cells, appendages membranous acute erect pollen masses large, oblong, attached by rather short caudicles to the rather large ovate, channelled, pollen carriers *Style-apex* rounded at top, bearing a rather large dome shaped apex *Fruit* not known

PERAK at Tjuk, *Scortechini* 1162

3 *MARSDENIA THYRSIFLORA*, Hook f in Fl Br Ind IV 37 (1883) A climbing shrub, branches pale brown, terete, uppermost branchlets minutely puberulous *Leaves* membranous broadly ovate or deltoid

ovate, acuminate at apex, deeply (often 1 to 1.25 in) cordate at base, the sinus 5 to 7.5 in broad, glabrous on both surfaces on young leaves only, slightly puberulous on the nerves beneath, 4 to 8 in long, 2 to 6 in broad, midrib rather broad with a cluster of small glands at its base, main nerves 5 to 7 pairs, the lowest 1 to 2 pairs in the basal lobes deflexed, the others curving upwards to anastomose near the margin, reticulations slender, prominent, petiole 1 to 3.5 in long terete. *Cymes* lateral, 4 to 6 in long, puberulous, spicate or racemose, rachis flexuous, somewhat flattened, flowers in clusters of about 3 to 6 on a tubercular base. Bracts small, acute, pedicels slender, 1 in long, buds ovoid. *Calyx* deeply cleft lobes ovate-lanceolate, obtuse, the margins hyaline, scales long, subulate. *Corolla* urceolate, glabrous without and within, lobes short, much thickened, lanceolate. *Corona* processes none, or reduced to a rounded film attached to the back of the anthers. *Stamens* with small spurs to the anthers, appendages long acuminate, connivent over the style apex. *Style* apic 5 lobed, flat, with a fusiform tip. *Follicles* (usually 1 only) lanceolate, 2 in long, .25 in broad, recurved, acuminate. Pericarp thinly coriaceous, smooth, glabrous. *Seeds* ovate, 2 in long, 1 in broad, broadly winged, coma short, white silky, testa very thin, pale brown. Cotyledons elliptic, .025 in long. Radicle as long as cotyledons. Plain Beng Plants 696. *M. tinctorum* in part Herb Hook f and Th.

PAHANG at Tahan river. *Rulley* 2414. DISTRICT India (Assam Khasia Hills, Jheels of Lower Bengal)

4. *MARSDINIA VOLUBILIS*, T Cooke Fl Bomb II 166 (1904). A stout climbing shrub with rough brown corky bark branchlets pale brown with occasional lenticels innovations whitish-puberulous. *Leaves* somewhat coriaceous when fresh, membranous when dry, broadly ovate or suborbicular, acuminate at apex, cordate or truncate or rounded, occasionally slightly cuneate at base, young leaves minutely tomentose, especially on the under surface, afterwards glabrous, ashy grey when dry, 2.5 to 6 in long, 1.75 to 4.5 in broad, midrib stout, raised beneath, furnished with a few small glands in a cluster at the base adjoining the petiole, main nerves also raised beneath, 4 to 6 pairs, the lowest 2 pairs from close by the base, spreading and curving upwards, reticulations prominent, usually raised, larger ones transverse, petiole 5 to 1.5 in long, stout or slender. *Cymes* umbellate, glabrous or mealy-pubescent, many-flowered, peduncles 1 to 2 in long, slender, arising from between the petioles, bracts ovate-acuminate, sometimes leafy, pedicels slender, .25 to 1 in long, buds globose, depressed, flowers bright green. *Calyx*-lobes ovate-oblong, obtuse, ciliolate, 1 in long glandular scales 5, minute, between the lobes. *Corolla* rotate,

deeply divided, tube 1 to 15 in long, lobes rounded, rather longer, glabrous without and usually within. *Corona*-processes large, fleshy, rounded, with a short beak extending over the top of the staminal-column and style-apex. *Staminal-column* arising from the base of the corolla, appendages membranous, ovate, obtuse, arching over the stigma, pollen-masses oblong-spathulate, large, waxy, attached by short thick caudicles to the linear-oblong pollen-carriers. *Ovary* of 2 pubescent carpels, style-apex dome-shaped. *Follicles* 2 (or 1, by abortion), broadly lanceolate, tapering to a blunt point, divaricate in a straight line, 3 to 4 in long, 1 in broad, pericarp smooth, yellow, mealy when young. *Seeds* broadly ovate, 5 in long, 3 in broad, broadly winged, the tip truncate, with a 2 in long coma of white silky hairs, testa smooth, shining, cotyledons ovate, 3 by 2 in, flat, radicle 1 in long. *Dregea volubilis*, Benth Gen Pl 775 ex Hook f Fl Br Ind IV 46, Trimen Fl Ceyl III 161 Prain Beng Plants 697. *Hoya viridiflora*, Br in Mem Weir Soc Edinb I 27 Wight Contrib 39, and in Hook Bot Misc II 98, t 1, and Ic t 586, Wall Cat 8168, Dalz & Gibbs Bomb Fl 153, Griff Ic Pl Asiat t 387, 388. *Asclepias volubilis*, Linn f Roxb Fl Ind ii 36. *Apocynum tiliaefolium*, Lank Encycl I 214. *Wattakaka viridiflora*, Hassk in Flora 1857, 79 "Watta-kaka-codi," Rheede Hort Mal IX t 15.

SIAMESE STATES Pulau Badak, Curtis 2997 — DISTRICT India, Ceylon, Java

The only Malay specimen available is a poor one, with small umbels and flowers smaller than in the usual Indian forms, but the structure agrees with the latter.

### 23 PERGULARIA, Linn

Twining shrubs. *Leaves* opposite. *Flowers* of moderate size, numerous, in pedunculate or sessile umbelliform cymes, lateral between the bases of the petioles. *Calyx* 5-partite, scales within 5 or none. *Corolla* hypocrateriform, tube inflated at the base, lobes 5, erect, overlapping to the right. *Corona* of 5 erect processes arising from the base of the staminal-column and adnate to it in the lower part, free above and with a narrow or subulate process on the inner face. *Staminal-column* arising from the base of the corolla, anthers oblong, erect, with long erect membranous appendages conniving over the apex of the style, pollen-masses solitary in each anther-cell, erect, attached in pairs to the pollen-carriers by very short caudicles. *Ovary* of 2 carpels, style not exceeding the anther-appendages, style-apex stout, ovoid-pentagonal. *Follicles* lanceolate, terete, rather turgid. *Seeds* ovate, concave, comose. — DISTRICT About 10 species, chiefly Indian and Malayan, one in Tropical and South Africa.

**PERGULARIA PUBERULA**, Miq Fl Ind Bat II 495 (1856) A twining shrub, branchlets slender, terete, puberulous as are the innovations. *Leaves* membranous, ovate or oblong-ovate, acuminate at apex, rounded or shallowly cordate at base, puberulous when young, when older only on the nerves, 3 to 5 in long, 2 to 3 in broad midrib slender, with a tuft of minute glands at the base above the petiole main nerves 6 to 7 pairs, the lowest 2 pairs rather close together, the rest distant, curving upwards to anastomose near the margin reticulations transverse, prominent on the lower surface petiole slender, puberulous, 1 to 1.5 in long. *Cymes* umbelliform, in pairs on the top of a 5 to 2 in long peduncle, puberulous, many-flowered bracts minute subulate pedicels slender, .25 to .5 in long buds oblong conical. *Calyx* membranous lobes ovate-obtuse, unequal, .05 to .1 in long, puberulous ciliate on the margins, scales obscure. *Corolla* pubescent without tube .25 in long, inflated below, slightly contracted at the mouth lobes linear oblong, obtuse, hispidly ciliate, as long as tube. *Corona* processes laterally compressed 2 winged below, beaked above, the inner face with a subulate curved appendage arching over the anthers and longer than them. *Pollen* masses oblong, obtuse, attached a little above their bases by very short stout caudicles to the bifid pollen carriers. *Style-apex* rounded conical. *Fruit* not known. Hook f Fl Br Ind IV 38

**PENANG** *Phillips* at Penang Bukit, *Curtis* 932 — **DISTRIB** Java (*Horsfield, Kurz*)

*P. minor* Andl Bot Rep t 181 is a garden species found in cultivation in India and Malaya and prized for its greenish yellow scented flowers. Its native home is uncertain. **MAIACCA** *Griffith*

## 24 SIFTHANTHUS, THOURAS

Twining shrubs, often long scandent. *Leaves* opposite, coriaceous. *Flowers* in umbelliform axillary pedunculate cymes, usually large, white and sweet scented. *Calyx* 5 partite, with large lobes, glandular scales usually none. *Corolla* hypocrateriform, tube long, cylindric, inflated at the base lobes twisted, overlapping to the right. *Corona* of 5 processes, adnate to the back of the anthers, flattened, sometimes none. *Staminal column* arising from the base of the corolla, anthers erect, with erect or inflexed membranous appendages, pollen masses solitary in each anther-cell, erect, attached in pairs to the carriers by very short caudicles. *Ovary* of 2 carpels, style short, style-apex conical or shortly beaked, hardly or not exerted. *Fruit* of 2 very thick, obtuse or acuminate, follicular mericarps. *Seeds* comose. — **DISTRIB** About

15 species, chiefly from Madagascar, a few from the Malay Archipelago and China

**STEPHANOTIS MAINGAYI**, Hook f Fl Br Ind IV 39 (1883) A stout, long-scandent, climbing shrub, branchlets stout, pale brown, puberulous with retrorse curved tubercular hairs *Leaves* coriaceous, chartaceous when dry, ovate or ovate-oblong, acuminate at apex, shortly cordate at base, both surfaces glabrous and yellow when dry margins recurved, 4 to 6 in long, 2 to 3 in broad, midrib slender but prominent, raised beneath main nerves 8 to 10 pairs, the lowest pair nearly at right angles to the midrib, the rest at about 45°, nearly straight, joining towards the margin in a looped intramarginal nerve, reticulations distant, transverse, petiole pubescent 5 to 1 in long, *Cymes* few flowered, peduncle 1 to 3 in long, stout, bracts small, subulate-acuminate, pedicels stout, puberulous, 75 to 15 in long buds elongate-clavate, flowers pale sulphur yellow, large, fragrant, 25 in in diam *Calyx* glabrous, except at extreme base tube very short, lobes oblong lanceolate, acute, 3-nerved with netted reticulations, 75 in long, 3 in broad, scales none *Corolla*-tube 1 in long, thick, with 5 thick ridges within opposite the anthers, the hollows between the ridges filled with brown stiff retrorse bristles lobes slightly longer than the tube or equal to it, ovate lanceolate, acuminate, spreading *Corona* none *Staminal-column* in all 5 in long, stout, on a thickened base anther wings horny, appendages pale, oblong, obtuse, pollen masses oblong, with very short scarcely apparent caudicles *Style apex* capitate, flattened, on a short column supported by a thickened ring *Fruit* not known

MALACCA climbing extensively over trees *Maingay* (K D) 1112  
SINGAPORE *Hullett* 147

## 25 TYLOPHORA B.

Erect or twining perennials *Leaves* opposite *Flowers* small, lateral between the bases of the petioles or axillary, in simple or branched cymes of flower-clusters or short racemes, or sometimes in sessile flower-clusters at the nodes of the stem *Calyx* 5-partite, 5-glandular within *Corolla* rotate or rotate campanulate, deeply 5 lobed, the lobes slightly overlapping to the right *Corona* of 5 small fleshy tubercular processes, adnate to or radiating from the filament part of the staminal-column and arising from near its base *Staminal column* arising from the base of the corolla, anthers erect, small, with small membranous appendages pollen-masses very minute, erect, suberect or horizontal, attached by their middle or near their base to very slender caudicles by which they are affixed in pairs to the pollen-

carriers Ovary of 2 carpels, style apex pentagonal or 5 lobed depressed, flattened or convex, rarely slightly exceeding the anthers Fruit of 2 (or by abortion 1) follicular mericarps, smooth, acute or acuminate, sometimes inflated or winged Seeds comose — DISTRIBUTION About 40 species widely distributed in the tropical and subtropical regions of the Old World and Australia

Leaves and branches and cymes glabrous, corona processes globose without free points above, calyx glabrous —

Flowers rather large 3 in broad at least leaves usually over 2 in long —

Corona processes globose shorter than the anthers, leaves 2.5 to 6 in long . 1 *T. longifolia*

Corona processes globose as long as the anthers leaves 1 to 3 in long 2 *T. globifera*

Flowers very small 1 in broad leaves under 2 in long 3 *T. tenuis*

Branches and inflorescence more or less pubescent calyx pubescent

Corona processes globose without free tips above, follicles where known slender acuminate —

Leaves glabrous corolla very small 4 *T. cili*  
Leaves tomentose corolla about 3 in broad 5 *T. hirsuta* var *pinangensis*

Corona processes with small free points above follicles broad ventricose obtuse —

Leaves 3 to 6 in long not or very slightly cordate at base 6 *T. hallichu*

Leaves 5 to 7 in long deeply cordate at base 7 *T. peruviana*

1 *TYLOTHORA LONGIFOLIA* Wight Contrib 50 (1834) A slender twining stems pale brown glabrous striate when dry Leaves membranous when dry ovate lanceolate or oblong lanceolate acuminate at apex rounded or slightly cordate at base glabrous on both surfaces 2.5 to 6 in long .75 to 1.75 in broad midrib slender raised beneath with a tuft of minute glands at the base just above the petiole main nerves 7 to 8 pairs the lowest 2 pairs close to the base the rest sharply curved upwards to and along the margin all raised beneath reticulations scanty, transverse petiole slender .5 to .75 in long, pubescent in the channel on the upper surface Cymes paniculate, glabrous lateral between the leaf petioles, up to 4 in long peduncles slender 1 to 2 in long branches divaricate, slender, flower clusters distant umbellate, 2 to 5 flowered pedicels capillary, 2 to 3 in long buds ovoid flowers rather large, up to 4 in in diam, yellowish green or red Calyx glabrous lobes lanceolate .025 in long scales minute Corolla rotate, tube very short lobes oblong lobtuse, 5 to 7 nerved membranous, 1 in long Corona processes dilated, globose shorter



than the anthers. *Anthers* broad, appendages short, incurved, pollen-masses ovoid, horizontal, attached by minute straight caudicles to the slightly spurred pollen-carriers. *Ovary* of 2 carpels, style-apex pentagonal, tip convex. *Follicles* 2, divaricate at right angles, lanceolate, poniard-shaped, long-acuminate, 3.5 to 4.5 in long, .25 in broad, pericarp thin, smooth. *Seeds* oblong, broadly winged, 4 to 5 in long, .15 to .2 in broad, base rounded tip broadly truncate, bearing a white silky coma .15 in long, testa thin, dark brown, smooth, cotyledons elliptic, .075 in long, nerved, radicle cylindric, .05 in long. Wall Cat 8205, Dene in DC Prodr VIII 608, Hook f Fl Br Ind IV 42

PERAK on Maxwell's Hill 3500 ft, *Wray* 4185, do *Ridley* 5514 *Scortechini* at 3500 to 4000 ft, *King's Collector*, 3317, 3318, 6301, at Cottage Hill, 4000 to 6000 ft, *Curtis* 145, 2087 — *DISTRIB* India (Sikkim, Khasia Hills, Sylhet)

2 *TYLOPHORA GLOBIFLORA*, Hook f Fl Br Ind IV 41 (1883) A slender, glabrous, twining undershrub branchlets glabrous, tomentose. *Leaves* membranous, ovate or ovate lanceolate, acuminate at apex rounded or slightly cordate at base both surfaces glabrous, smooth margins slightly recurved, 1 to 3 in long, .5 to 1.5 in broad, midrib slender, raised beneath, main nerves 4 to 7 pairs, at first nearly straight, then curving to join in an intramarginal looped nerve, petiole .25 to .5 in long, slender. *Cymes* long peduncled, compressed, few flowered, more or less umbellate peduncles about 1 in long, bracts lanceolate acuminate, pedicels filiform, .5 to .75 in long buds ovoid, depressed, flowers blue (*Kunstler*). *Calyx* glabrous lobes ovate lanceolate, 1 in long. *Corolla* 3 in in diam, cleft half-way down lobes ovate, .15 in long, prominently nerved. *Corona*-processes globose, large, as high as the anthers. *Anther* appendages short, crenate, incurved over the style-apex, pollen-masses ellipsoid, horizontal joined by straight caudicles to the small oblong pollen-carriers. *Style apex* 5 lobed, tip convex. *Fruit* not known

PERAK banks of Beluran river, *King's Collector* 8853 MALACCA *Griffith* 3764 — *DISTRIB* Andaman Islands, Borneo

3 *TYLOPHORA TENUIS*, Blume Bijdr 1062 (1826) A slender twining stems much branched, very slender, glabrous, the nodes pubescent, the internodes sometimes only. *Leaves* somewhat fleshy when fresh, membranous when dry, variable in shape, ovate-elliptic or -oblong or lanceolate, acute or apiculate at apex, rounded or slightly cordate at base, margins recurved, .75 to .2 in long, .25 to .1 in broad, midrib slender, puberulous above, main nerves 4 to 5 pairs, indistinct, nearly straight to join an intramarginal looped nerve, reticulations obscure

petioles 25 to 5 in long, puberulous in the channel on the upper side  
*Cymes* from between the petioles, very slender, paniculate, glabrous,  
 reaching 4 to 5 in in length, rachis filiform, flexuose, its branches  
 divaricate finally bearing few-flowered subumbellate racemes, pedicels  
 filiform, 25 to 5 in long, bracts minute, lanceolate-subulate, buds  
 globose, flowers dark purple *Calyx* glabrous, lobes lanceolate, 0.25 in  
 long *Corolla* rotate, tube short, lobes ovate oblong, obtuse, 3 nerved  
*Corona* processes inflated, somewhat annular-globose, as long as the  
 filaments *Inters* slender, appendages very short, incurved pollen  
 masses minute, horizontal, ovoid, attached by straight caudicles to the  
 rather slender pollen carriers *Ovary* of 2 carpels, style apex pen-  
 tagonal, top convex *Follicles* 1 or 2, 2 to 3 in long, lanceolate poniaid  
 shaped, long acuminate pericarp membranous, smooth *Seeds* ovate  
 2 to 25 in long, broadly winged, dentate below, truncate at tip, and  
 bearing a white silky coma 75 to 1 in long testa dark brown, striate,  
 sparsely tubercular cotyledons elliptic, radicle cylindric, both together  
 0.5 to 1 in long Dene in DC Prodr VIII 608 Miq Fl Ind Bat  
 II 488 Hook f Fl Br Ind IV 42 Trimen Fl Ceyl III 158  
 Cooke Fl Bomb II 162 Prain Bong Plants 698 *T. carnosus*, Wall  
 in Wight Contrib 49 Wall Cat 8200 Wight Ic t 351 Dene in  
 DC l c 607 Miq l c 488 *T. tenuissima*, Wight Contrib 47, and Ic  
 t 588 Dilz & Gibbs Bomb Fl 150 Dene in DC l c 607 *Asclepius*  
*tenuissima*, Roxb Hort Bong 20, and Fl Ind II 41 *A. duholoma*,  
 Rott. in Wall Cat 8200 B c *Ceropegia Decarsneana*, Miq Pl  
 Hohenack 634

PENANG Curtis 1526 PERAK Wray 2125 *Scortechini*, King's  
 Collector 6099 10600 MALACCA Griffith, Manqay (K D) 1108, 1139  
 JOHORE Ridley 4030, 9162 SINGAPORE Ridley 5746, Kunth 113,  
 266 —DISTRIB India Burma, Ceylon, Java, Borneo (Haviland 3060)

4 TYLOPHORA LXIIII, Colebr in Trans Linn Soc XII 358, t 16  
 (1817) A slender twiner branchlets pale brown, terete, slender,  
 puberulous *Leaves* chartaceous when dry ovate-oblong or lanceolate,  
 shortly and abruptly acuminate at apex, rounded at base, glabrous on  
 both surfaces, margins recurved, 2 to 3 in long, 1 to 1.5 in broad  
 midrib slender, impressed above, raised beneath, with a few minute  
 glands at its base, main nerves 4 to 6 pairs, the lowest 2 pairs close  
 together, the rest distant, curving upwards to meet in a looped intra-  
 marginal nerve raised above, secondary nerves few, reticulations  
 obscure petiole slender, 5 to 1 in long, articulate at the base  
*Inflorescence* longer than the leaves, up to 4 in long, puberulous  
 rachis slender, flexuous, simple or rarely branched, bearing at its nodes  
 umbellately racemose flower-clusters, the clusters many flowered bracts

minute, persistent, pedicels slender, 1 to 15 in long, buds very small, globose, flowers light brown. *Calyx* pubescent without, lobes ovate acute, ciliate, 04 in long, scales minute. *Corolla* rotate, very small, glabrous, membranous, lobes 05 in long, 3-nerved. *Corona*-processes inflated, obtuse, shorter than the anthers. *Anther*s slender, appendages short, membranous, pollen-masses ovoid, attached by very short straight caudicles to the minute slightly spurred pollen carriers. *Ovary* of 2 carpels, style-apex pentagonal, flat, very slightly convex at tip, *Follicle* 1, subulate, acuminate, 3 to 4 in long, 25 in broad, pericarp chartaceous, smooth, glabrous. *Seed*s ovate oblong, 25 to 35 in long, 1 in broad, slightly contracted above below the broad truncate tip, which bears a white silky coma 75 to 1 in long, denticulate at base, broadly winged. testa brown, thin, shining, striate cotyledons elliptic, 1 in long, 3 nerved. radicle cylindric, 05 in long. Wight Contrib 50, Wall Cat 8206, Dene in DC Prodr VIII 608 Hook f Fl Br Ind IV 44, Prain Beng Plants 698 *Pergularia erilis* Spreng Syst I 844

PERAK at Kota, Wray 2417, 3053 King's Collector 6470 DINDINGS on Pangkore Island, *Scortechini* 1035 MALACCA Griffith 3764 — DISTRIB India (Assam, Sylhet, Chittagong)

5 TYLOPHORA HIRSA, Wight Contrib 49 (1834), Wall Cat 8201 Dene in DC Prodr VIII 607 Hook f Fl Br Ind IV 43 *T. Jacquemontii*, Dene l c *Gymnema hirsutum*, Wall Tent Fl Nep 50 — DISTRIB India (Himalaya from Kumaon eastwards Eastern Bengal)

VAR *penangensis*, Hook f in Fl Br Ind IV 43 A climbing shrub, branchlets densely ferruginous tomentose. Leaves subcoriaceous, ovate or ovate lanceolate, acuminate at apex, attenuate, rounded, or somewhat cordate at base, both surfaces ferruginous tomentose, the hairs with bulbous bases, 2 to 4 in long, 1 to 1.75 in broad midrib rather stout, main nerves 4 to 6 pairs, curved upwards to and along the margin, reticulations netted, petiole 5 to 7.5 in long, densely tomentose. Cymes ferruginous-villous, much branched, 1 to 5 in long, branches dichotomous. flowers in racemiform clusters on enlarged many-bracteate rachises, bracts ovate-acuminate, pedicels very slender, 2.5 to 5 in long. *Calyx* lobes pubescent, very small, 3 in long, ovate-acute. *Corolla* deeply cleft, lobes triangular-ovate, acute, 1 in long. *Corona* of 5 subglobose processes on the backs of the anthers and shorter than them. *Anther*-appendages short, incurved, pollen-masses nearly globose, horizontal, attached by slender slightly curved caudicles to the oblong pollen-carriers. *Style-apex* 5-angled, included within the anthers. *Fruit* not seen. *T. mollissima*, Wall Cat 8202

PENANG *Phillips* at Waterfall stone-quarry, *Curtis* -DISTRIB China? *Wallach* 8202 (cult in Hort Calc)

After examining specimens at Kew, we prefer to leave this plant in its present rather doubtful position, rather than to accept the suggestion in Fl Br Ind that it may be *T. villosa*, Blume, of Java. Its place will probably have to be reconsidered when better specimens are available.

6 *TYLOPHORA WALLICHII*, Hook f Fl Br Ind IV 45 (1883) A slender twining shrub branchlets slender, terete, younger puberulous. Leaves thickly coriaceous when green, chartaceous when dry, ovate lanceolate or ovate-oblong, acuminate at apex, rounded or slightly cordate at base both surfaces glabrous except the nerves beneath when young, margins slightly recurved, 3 to 6 in long, 5 to 2 in broad midrib rather stout, raised beneath, with a few minute glands at the base above the petiole main nerves 6 to 8 pairs, curving upwards to join in a rather obscure intramarginal looped nerve, reticulations transverse obscure petiole slender, puberulous, 75 to 1 in long, articulate at the base. Inflorescence lateral from between the bases of the petioles, often longer than the leaves divaricately branched, subsessile or on peduncles 5 to 75 in long branches slender long, flower-clusters racemose, pubescent with many minute ovate acute sheathing persistent bracts pedicels capillary 3 to 4 in long, pubescent buds globose flowers pale yellow. Calyx membranous lobes ovate-oblong, acute, 5 in long, ciliate, pubescent without scales minute. Corolla rotate campanulate tube 0.5 in long lobes ovate-oblong acute 1 in long, thin 5 nerved. Corona-processes thick, rounded, fleshy, ending in a cuspidately acute point, reaching to the level of the style apex. Lather narrow, appendages very short, pollen-masses very minute, nearly globose, attached by very slender straight caudicles to the minute pollen carriers. Style apex pentagonal top convex. Follicle 1, recurved to the horizontal, 3.5 to 4 in long, 1 in broad, oblong-ellipsoid ventricose, obtuse at the tip, pericarp light green, pale brown and chartaceous when dry and longitudinally striate. Seeds flattened, 5 in long, broadly ovate, with a broad wing, testa brown, shining, tip truncate, bearing a 1 in long white silky coma, cotyledons broadly ovate, 3-nerved, 15 to 2 in in diameter, radicle cylindric, 0.75 in long *Gymnema Wallichii*, in part, Wight Contrib 46 & *sagittatum*, Wall Cat 8194B

PENANG in Pulau Betong Reserve, *Curtis* 933, PERAK *Wray* 3047, *King's Collector* 5259, 5439 MALACCA *Griffith*, *Mangay* (K D) 1142 SINGAPORE *Wallach* 8194B

7 *TYLOPHORA PERAKENSIS*, King & Gamble, n sp A climbing shrub, branches stout, fleshy, branchlets smooth, striate, pale brown

when dry, internodes long *Leaves* membranous when dry, ovate, acuminate at apex, deeply cordate at base, glabrous on both surfaces, 5 to 7 in long, 2 to 3 in broad, midrib slender, raised beneath, bearing a small cluster of glands at the base just above the petiole, main nerves 9 to 10 pairs, the lowest 1 or 2 pairs decurved into the basal lobes, the rest curving upwards to anastomose near the margin in an obscure looped nerve, reticulations few, transverse, prominent when dry, petiole fleshy, glabrous, 1 to 3 in long, articulate at the base *Inflorescence* lateral from between the petioles, as long as or longer than the leaves, divaricately branched, glabrous, peduncles stout, 1 to 1.5 in long, branches long, slender, flower-clusters umbellate, 6 to 8 flowered, bracts minute, usually soon deciduous, pedicels capillary, 1 to 2 in long, buds ovoid, flowers green *Calyx* pubescent without, lobes ovate-acute, 0.75 in long, ciliate, scales subulate *Corolla* campanulate-rotate, tube short, lobes oblong obtuse, 5 nerved, thickened, minutely pubescent above *Corona* processes nearly globose, fleshy, shorter than the anthers, point small, appressed to the anthers, acute *Anthers* slender above, appendages acuminate, incurved, pollen-masses nearly globose, very minute, attached by slender straight caudicles to the minute pollen carriers *Style-apex* pentagonal, top convex *Follicle* 1, ventricose, only slightly recurved, 5 to 6 in long, 1.5 in broad, oblong, very obtuse at tip, pericarp light green and glossy when fresh, chartaceous when dry, striate longitudinally, disseminations fibrous crustaceous *Seeds* flattened, 5 in long, broadly ovate, with a broad wing, testa brown, shining, tip with a .75 in long white silky coma, cotyledons broadly ovate, 3 nerved, 1.5 in long, radicle cylindric, 0.75 in long

PERAK at lower camp, Gunong Batu Pateh, 3400 ft., Wray 1227 in open jungle at 200 to 300 ft., King's Collector 5761, 7178, 8343, at Ipoh, Curtis 3186 — *DISTRIB* Borneo (Teysmann 11578, Motley 625)

This species comes very near to *Walluchii*, but is much larger and more glabrous, has more deeply cordate leaves, a larger inflorescence with umbellate instead of racemose flower clusters, a less beaked corona and longer anther appendages. Curtis No. 3186 has one inflorescence with the flower clusters racemose and the others umbellate, and seems to come between the two species, but in other respects it belongs to this

## 26. HETEROSTEMMA, W & A

Twining shrubs *Leaves* opposite, often 3 to 5 nerved at the base *Flowers* small, in lateral sessile or pedunculate umbellate or racemose cymes *Calyx* 5-partite *Corolla* campanulate, urceolate or rotate, lobes triangular, valvate or slightly overlapping to the right *Corona*

of 5 thin or fleshy processes spreading more or less horizontally from the staminal-column, usually with an erect tubercle on the upper side, the tips flat or dentate or laciniately cleft. *Staminal column* short, depressed, the anthers minute, ending in a small membranous appendage, pollen masses 1 in each anther cell, subquadrate or rounded, sometimes with a thin margin on the inner side, erect, sessile or attached by very short caudicles to the pollen-carriers. *Ovary* of 2 carpels, distinct or combined, style apex pentagonal, flat, not exerted beyond the anthers. *Fruit* of 2 distinct or adherent slender straight follicular mericarps. *Seeds* thin, winged, comose, the margin recurved.—**DISTRIB** About 10 species, Indian and Malayan.

Corolla rotate-campanulate, corona thin long entire or lacinate, spreading horizontally, leaves truncate or cordate at base .. 1 *H. piperifolium*  
Corolla ovoid uiceolate, corona thick, short, much fimbriate, more or less erect, leaves cuneate at base .. .. 2 *H. fimbriatum*

1 *HYPEROSTYLMA PIPERIFOLIUM*, King & Gamble, n. sp. A slender twining shrub branchlets pale, terete, slightly channelled when dry, uppermost very minutely puberulous. *Leaves* membranous when dry, 3 to 5 nerved triangular ovate, acuminate at apex, broadly truncate at base sometimes slightly decurrent both surfaces minutely puberulous the lower the most 2.5 to 3.5 in long, 1.5 to 2.5 in broad midrib slender, furnished at the base with 1 or more rather conspicuous glands, main nerves 4 pairs, the lowest 2 pairs from the base, the first pair very small, the second strong and with the others curving upwards to join near the margin, reticulations few, obscure, irregular. *Petiole* slender, twisted 7.5 to 2 in long. *Cymes* few flowered, umbellately racemose, on stout 5 to 7.5 in long peduncles the rachis of the raceme thickened, with minute bracts, pedicels slender, 2.5 in long buds globose, depressed, flowers yellow. *Calyx* lobes ovate, .05 in long ciliate, the margins hyaline, scales minute. *Corolla* rotate campanulate, 3 in broad, puberulous without, the base short at first, then spreading, divided about half-way down, lobes triangular, incurved. *Corona* processes spreading, lying flat on the corolla, 1 in long, linear lanceolate, entire or variously lacinate, the upper part with a slight rounded protuberance or nearly flat. *Staminal column* short appendages membranous, curved over the style-apex, pollen masses erect, waxy, flattened on the inner, curved on the outer edge, sessile on the triangular elongate pollen-carrier. *Carpels* distinct, style apex thin, flattened, 5-gonal. *Follicles* slender, long acuminate, recurved to about 3 right angles, 4 to 5 in long, 1.5 to 2 in broad, pericarp thin, smooth. *Seeds* ovate-oblong, very thin, with broad thin margins, apex bearing a 7.5 in long white silky coma, testa very thin, brown.

PERAK at Kwala Dipang, Ridley 9619, at Larut, 200 to 500 ft, King's Collector 2338, 7973, at Ijuk, *Scortechini* 1097, 1150

At first sight this species closely resembles *H. chrysanthum* (*Symphysocarpus chrysanthus*, Hassk.), but differs completely in the corona and in the very divaricate follicles

VAR *cordatum*, King & Gamble *Leaves* cordate to a depth of about 4 in., main nerves 5 to 6 pairs, the basal pairs 3, of which the lowest much deflexed in the lobes of the leaf. *Corona*-lobes usually entire. Rest as in the type

PERAK *Scortechini* Only one rather poor specimen of this is available

2 *HETEROSTEMMA LIMBIATUM*, King & Gamble, n. sp. A twining shrub stems pale brown, with 2 longitudinal lines of hairs. *Leaves* fleshy, chartaceous when dry, oblong or oblong lanceolate, acuminate at apex, cuneate at base both surfaces glabrous, lower pale, margins slightly recurved 3.5 to 4.5 in long, 1.5 to 2 in broad, midrib stout raised beneath when dry, furnished with a cluster of rounded glands at the base above the petiole main nerves 5 pairs prominent and raised when dry, with a slender obscure pair in addition from the very base, the second pair from about 2.5 in above the base, all obliquely curved upwards to join in a looped intramarginal nerve, reticulations not visible even when dry petiole stout, 5 to 7.5 in long much curved and swollen at the base. *Cymes* racemose, on short (1.5 in) very stout peduncles, the rachises of the racemes about 3 in long, thick, suboblate, with cushion like bracts pedicels slender, angular, 5 in long, puberulous, buds rather large, ovoid orbicular. *Calyx* very small, lobes minute, ovate-acute ciliate. *Corolla* ovoid urceolate, thick, fleshy pubescent without, glabrous within, 3 to 4 in long, divided at most to one third of its length in triangular lobes slightly overlapping to the right and erect. *Corona* processes nearly erect, attached to the staminal-column, thick fimbriate at the tips in 2 rows of subulate teeth. *Staminal column* short anther cells rounded appendages very small, membranous, bifid, pollen masses rounded, with a thin straight margin on the inner side, nearly horizontal, sessile on a triangular pollen-carrier. *Carpels* distinct, elongate style-apex 5-gonal, tip concave. *Fruit* not known

PERAK at G. Ijuk, *Scortechini* 1220

Only one rather poor specimen of this is available. The plant seems to be an *Oenanthus*, but that genus—as suggested by Hooker in the Fl. Br. Ind. and by Bentham in his remarks to Ic. Pl. t. 1191, under *O. urceolatus*, Benth., to which this species is very close—seems scarcely separable from *Heterostemma*. In many ways our species strongly resembles *H. alatum*, Wight.

27 HOYA, Br

Twining pendulous (rarely erect) or rambling and rooting, often epiphytic, shrubs. *Leaves* opposite, usually thick and fleshy or coriaceous. *Flowers* in axillary, lateral or terminal, umbelliform, racemose cymes, usually on a thickened tuberculate rachis, sessile or pedunculate. *Calyx* small, 5-partite, with 5 glandular scales. *Corolla* rotate or rotate campanulate, fleshy or waxy, lobes 5, often convex or spreading or reflexed, valvate in bud. *Corona*-processes 5, large, fleshy-membranous or horny, adnate to the staminal-column, the lower lobe stellately spreading or ascending, turgid or compressed, often concave on the upper surface, the upper lobe usually produced into a tooth or process which is erect and incumbent on the anther. *Staminal column* usually short, arising from the base of the corolla; anthers conniving over the style apex, membranous, appendages membranous, erect or inflexed; pollen masses 1 in each anther-cell, erect, waxy, usually flattened, often thickened on the outer margin, attached by caudicles of various shapes, usually short, sometimes enlarged thickened or cup-shaped, sometimes long, to the horny hard pollen carriers. *Ovary* of 2 distinct carpels; style apex 5-angled, tip flattened or conical apiculate. *Fruit* of 1 or 2 follicular mericarps, usually slender with a thin pericarp, rarely turgid with a thick one. *Seeds* small, oblong or ovate, comose, cotyledons flattened, thick, radicle cylindrical. **DISTRIB.** About 70 species, found in Tropical Asia and Australia.

Corolla reflexed, lobes longer than broad —

Staminal column stipitate, corona processes with long narrow lobes the upper erect, the lower horizontal with usually upcurved tip (Sect I CYRTOCERAS)

1 *H. multiflora*

Staminal column sessile corona processes inflated —

Corona processes with lower lobe ovoid, laterally compressed, upper lobe, smaller rounded, erect, corolla tube densely villous (Sect II PTEROSTELMA) .. ..

2 *H. lasiantha*

Corona processes with lower lobe globose, hollow, upper shorter curved, corolla tube with a broad annular ring (corolline corona ?) (Sect III HIOGOPHORA) .. ..

3 *H. curtissii*

Corolla spreading, lobes spreading or incurved, rarely reflexed, broader than long, staminal column sessile or subsessile, corona processes with lower lobes spreading, upper acute (Sect IV EUPHOYA) —

Corona with lower lobes of processes obtuse —

Lower lobes suberect, laterally compressed, leaf nerves horizontal —

Lower lobes rounded, inflated, upper lobes acuminate, veins thick, leaves thick, fleshy, over 4 in long —

Flowers yellow, corolla under 1.5 in in diam .. 4 *H. obtusifolia*



- Flowers dark purple; corolla much over 1·5 in. in diam. 5. *H. imperialis*.  
 Lower lobes beaked; upper lobes short, acute; stems slender; leaves thin, under 4 in. long .. 6 *H. elliptica*.  
 Lower lobes horizontal or nearly so, flattened above; leaf-nerves usually at an acute angle with the midrib —  
 Flowers large, reaching 1·5 in. in diam; leaves velvety pubescent beneath, caudicles of pollen-masses long, slender, twisted .. 7. *H. coronaria*.  
 Flowers small, rarely ·5 in. in diam., leaves glabrous beneath, caudicles short, usually thick —  
 Lower lobe of corona very thick and blunt vertically, upper short, leaves ovate-lanceolate, cordate, faintly nerved .. 8. *H. Scortechinii*.  
 Lower lobe of corona thin vertically, short —  
 Leaves obscurely nerved, about 3 to 4 pairs, very thick, lower corona-lobes obtuse; upper long, acuminate, appendages very long acuminate . 9 *H. caudata*  
 Leaves prominently 3- to 5-nerved, very thick, peduncles many from the axils, lower corona-lobes concave, obtuse .. 10 *H. latifolia*.  
 Leaves not 3-nerved from the base, peduncles usually 1 only at the axils —  
 Leaves small; main nerves at right angles to the midrib, indistinct .. 11 *H. lacunosa*  
 Leaves moderate-sized, under 4 in. long; elliptic or obovate, main nerves indistinct, at about 60° with the midrib, climber .. 12 *H. diversifolia*.  
 Leaves large, over 7 in long, oblanceolate, main nerves prominent, as are reticulations, trailer, epiphytic .. 13 *H. Maingayi*  
 Corona with lower lobes of processes acute or nearly so —  
 Leaves with nerves easily visible when dry —  
 Leaves with 5 basal nerves, the lowest pair faint .. 14 *H. parasticta*.  
 Leaves pinnately nerved —  
 Flowers moderately large, ·5 in. in diam in bud; leaves with not very conspicuous reticulations, folioles with very thick pericarp . 15. *H. coriacea*.  
 Flowers small, ·25 in. in diam in bud —  
 Leaves large, usually over 5 in in length and 1·5 in. in breadth, main nerves very prominent —  
 Main nerves at 40° with the midrib, reticulations prominent, chiefly on upper surface, but not sharp 16. *H. Forbesii*  
 Main nerves at 60° with the midrib; reticulations very prominent and sharp on both sides, folioles with thin pericarp .. 17. *H. Finlaysonii*.  
 Leaves moderate sized, usually under 5 in. in length and 1·75 in. in breadth; main nerves nearly at right angles to midrib, rather faint on both surfaces . 18 *H. Ridleyi*  
 Leaves with nerves not or very faintly visible when dry —

Flowers minute; corolla rarely over 15 in in diameter, pedicels filiform

Leaves lanceolate, margins only slightly recurved 19 *H. pariflora*

Leaves ovate or ovate lanceolate, margins very strongly recurved 20 *H. revoluta*

Flowers moderate sized; corolla 4 in broad, pedicels thick, broadly flattened when dry, leaf margins slightly recurved 21 *H. plicata*

Corolla rotate campanulate, lobes very short, broader than long, corona processes with lower lobes spreading, upper erect (Sect V CYSTIDIANTHUS) —

Flowers rather large, corolla over 1 in broad, leaves rather large, with conspicuous nerves, shrubby, apparently not rooting along the stems 22 *H. campanulata*

Flowers small, corolla 3 in broad, leaves small, with nerves not or scarcely visible slender rooting all along the stems 23 *H. Wrayi*

1 HOYA MULTIFLORA, Blume Cat Hort Buit 49 (1823), and Bijdh 1064 An epiphytic undershrub, rooting from the branches on the bark of trees, branches stout, smooth, pale, glabrous. Leaves coriaceous membranous when dry oblong or oblong lanceolate, acuminate at apex, acute at base both surfaces glabrous, more or less shining, margins reflexed 3 to 8 in long, 1 to 2 in broad, midrib stout raised beneath when dry main nerves 7 to 10 pairs, the lowest pair faint, close to the margin, the rest curving upwards to and along the margin where they join in loops secondary nerves few or none reticulations transverse, irregular, netted, more obvious on the upper surface, petiole stout, 5 to 75 in long Umbels racemose, many flowered (40 to 50), on a stout tubercular bracteate nearly globose rachis at the end of an interpetiolar peduncle peduncle stout 1 to 2 in long pedicels slender, 15 to 2 in long, flowers white tipped with yellow or yellow tipped with brown, with waxy white corona. Calyx membranous, cleft about two thirds down lobes oblong, 075 in long scales rounded, flattened Corolla rotate, completely reflexed when open tube minutely bearded at base, 2 in long, lobes triangular 25 in long, with small folds in the sinuses Corona of 5 horny glabrous processes, with erect upper lobes, conical, longer than the anthers and a horizontal or upcurved horn-like lower lobe at the base, each about 15 to 2 in long Staminal column 3 in long, stipitate, anthers erect or slightly inflexed, appendages very small, inflexed, pollen masses oblong, 05 in long, with a narrow thin outer margin, attached by short cup-like caudicles to the narrow usually clavate pollen-carriers Style apex conical apiculate at tip Follicle 1, slender, pendulous, 7 to 8 in long, 3 in broad, pericarp thin, smooth Seeds small, oblong, 25 in long, narrowly winged above on both sides, broadly truncate, with a 2 in long white silky coma testa very thin, brown

cotyledons oblong, 0.75 in long, radicle cylindric, 0.5 in long Hook f Fl Br Ind IV 52 *H. coriacea*, Lindl Bot Reg 1839, t 18, not of Blume *Cyrtoceras multiflorum*, Benn in Herb Horsf, Miq Fl Ind Bat II 514 *Cyrtoceras reflexum*, Benn in Horsf Pl Jav Rar 90, t 21, Ridley in Trans Linn Soc Ser 2, III 321 *C. floribundum*, Maund Botanist, IV t 178 *Centrostemma multiflorum*, Dene in Ann Sc Nat Ser 2, IX 272, and in DC Prodr VIII 634, Blume Mus Bot Lugd-Bat I 45 Hassk Flor Bot Zeit IX (1845) 250, Bot Mag t 5173 (*Lindleyanum*, Dene in DC l c

PLANG (drawing in Herb Kew), at Gunong Pulai, 1800 ft, (r King PERAK at Tea Gardens, Curtis, at Gunong Kehdang, Ridley 9739, at Birjay Malacca, and Gunong Harau Pahang, *Scortechini* 635, 1905, on tree branches in forest, 1000 to 3000 ft King's Collector (Kunstler) 2423, 7297 MALACCA on Mount Ophi, Manray (K D) 1123 - DISTRIB Borneo (Boronga Island, Ariacan, Kuz), Java, Borneo, Philippine Islands

2 HOYA LABIANINA, Korthals in Miq Fl Ind Bat II 526 (1856) A climbing and perhaps epiphytic undershrub, branchlets rather stout, smooth, yellowish when dry. Leaves thinly fleshy when fresh, chartaceous when dry, elliptic or lanceolate, cuspidate acuminate at apex, acute or rounded at base, both surfaces glabrous, upper shining, margins slightly recurved, 4 to 6 in long, 1 to 2.5 in broad, midrib slender, impressed above, raised beneath, with a small pit or gland just above the petiole, main nerves prominent, impressed above, 8 to 10 pairs, at an angle of 50° to 60° with the midrib, curving upwards to and along the margin, the upper ones forming a looped intramarginal nerve, reticulations netted most prominent on the upper surface, petiole stout, 5 to 7.5 in long Umbels 8 to 12-flowered on short tubercular rachises at the ends of stout axillary or lateral peduncles 1 to 3 in long pedicels slender, 1.5 to 2 in long, glabrous flowers orange yellow with white soft hairs, the corona ochreous yellow, shining Calyx membranous, hyaline with dark nerves, lobes ovate to nearly orbicular, scales subulate Corolla about 8 in broad when spread open, tube very short, lobes lanceolate acuminate, densely white villous at their base, recurved in flower Corona of 5 shining processes, horny when dry, adnate to the lower part of the anthers, the lower lobe ovoid, somewhat laterally flattened, inflated, cleft beneath into two wings, the upper also erect, tongue-like, rounded Staminal-column moderately long, anthers closely appressed to the upper lobe of the corona, cells slightly divergent, appendages scarious, broad, obtuse, pollen-masses rather long, waxy, flattened, oblong, attached by short, rather thick, cup like caudicles to the conical pollen-carriers Style-apex 5-angled, tip conical, acumi-

nate *Follicle* 1, slender, 7 in long, about 25 in broad, nearly horizontal, pericarp thin, striate. *Seeds* 2 in long, elliptic with a short neck, truncate at tip, bearing a white silky coma 15 in long cotyledons fleshy, elliptic, 1 in long, radicle cylindric, .05 in long N E Brown in Gard Chron XVIII 333 (1882), fig 57 *Plocostemma lasianthum*, Blume in Rumph IV 30, and Mus Bot Lugd Bat I 60, t XIV, Bot Mag t 5081

PERAK *Scortechini* 605 SELANGOR at Semeniyeh, (goodenough for Ridley 8194 —) DISTRIB Java, Borneo (*Korthals*)

The cultivated specimen imported from Borneo, represented in Bot Mag t 5081, and that collected by Curtis at Wyncoop's Bay, Java, and figured by N E Brown in the Gardeners Chronicle, appear to differ somewhat from the Malay Peninsula specimens in having larger leaves cordate at the base and rather larger flowers. But we fail to find any difference in the structure of the flowers. Another Java specimen (Curtis No 61) which was sent to Messrs Veitch & Co, agrees well with the Peninsular plants

3 HOYA CURTISII, King & Gamble, n sp. A twining small epiphytic undershrub, rooting at almost all the nodes on the bark of trees or on rocks, branchlets slender, pubescent. *Leaves* sessile, very thick orbicular abruptly triangular acuminate at apex, rounded or sometimes very slightly attenuate at base both surfaces scabrous punctulate when dry margin thickened 4 to 7 in long, 4 to 6 in broad midrib when dry faint other nerves invisible petiole none. *Umbels* sessile, terminal or axillary, 10 to 16-flowered, on a 25 in long tuberous rachis pedicels slender, pubescent, 75 to 1 in long flowers rather large. *Calyx* with very short tube or almost none lobes oblong, ciliate villous without, membranous 1 in long, much recurved scales minute. *Corolla* also much recurved, tube very short, with an annular spreading ring (or corolline corona ?) a little above the base, lobes spatulate acute at the tip, minutely scurfy pubescent, 25 in long. *Corona* corolline (see above), annular staminal, of 5 cucullate processes nearly globose when closed, but formed of 3 lobes, the two side ones rounded, the upper ovate, the three enclosing a cavity, and the whole corona much overtopping the staminal-column. *Staminal column* short and shortly stipitate, attached at the base of the corolla tube, anther coils much divergent appendages ovate, membranous, dentate, pollen masses oblong-obtuse, about .03 in long, attached by oblong fleshy thick caudicles to the conical pollen carriers. *Style* apic shortly 5-angled, somewhat depressed, tip bifid, very short. *Fruit* not known

PERAK at Waterloo, 2000 ft, Curtis 2894

4 HOYA OBTUSIFOLIA, Wight Contrib 38 (1834) A climbing (epiphytic ?) shrub, with stout fleshy branches reaching 5 in in diameter

and smooth puberulous bark. *Leaves* very thick, fleshy, oblong, rounded or emarginate and usually apiculate at apex, rounded or cordate at base; both surfaces shining, glabrous except on the midrib, margins recurved, 4 to 6 in. long, 2 to 3 in. broad, midrib very thick, channelled and pubescent above, raised and glabrous or puberulous beneath; nerves visible only when dry and then main nerves seen to be nearly horizontal, about 10 to 12 pairs, soon branching, petiole very thick, 5 to 1 in. long, puberulous. *Umbels* many-flowered, racemose, on thick tubercular rachises .5 to .75 in long and up to about .4 in. in diam., at the ends of thick 1 to 3 in. long puberulous peduncles which are apparently lateral, pedicels rather thick, 1 to 1.5 in. long, puberulous, slightly enlarged below the calyx and dotted, buds 5-angled, acute at tip, .4 in. long, flowers dull yellow. *Calyx* fleshy, lobes linear-oblong, obtuse, recurved, .15 in long, dotted and pubescent without. *Corolla* nearly 1 in in diam when open, pubescent without, glabrous within, lobes ovate-cordate-acuminate, generally erect, .4 in long. *Corona* of 5 processes, the lower lobe suberect, obtuse, inflated, concave above and channelled beneath, the upper erect, longer than the anthers, acuminate. *Staminal-column* short, anther-cells parallel with small divergent wings below, appendages membranous, erect, acute, pollen-masses oblong, rounded, thin on the outer margin, attached by rather long curved caudicles to the rather large conical pollen-carriers. *Style-apex* obscurely 5-angled, obconical, long-apiculate. *Fruit* not known. Wall Cat 8167, Dene. in DC Prodr VIII 638, Hook. f Fl Br Ind. IV. 58 *H. Teysmanniana*, Miq Fl Ind. Bat. II. 522

PENANG: ? Wallich 8167. PERAK *Scortechini* PAHANG. Ridley 2732. SINGAPORE at Serangoon, on mangrove trees, Ridley 8932.—  
DISTRIB Tenasserim or Andaman Islands (*Helpe* 3790), Sumatra (*Teysmann* 1170), Java

The colour of the flowers seems to be a little in doubt. Teysmann gives it as "white," the Fl. Br Ind. says "dull yellow," Ridley says "white with a red centre." It would seem therefore probable that the corolla is white turning yellow and the corona red.

5. HOYA IMPERIALIS, Lindl. in Bot. Reg (1846) under t. 68, in note, and in Journ. Hort. Soc. V. 80 with woodcut (1850). A stout climbing shrub, rooting on trees and probably epiphytic, branches rounded, dark green, puberulous, punctulate and with papery bark when dry, reaching 5 in. in diam. *Leaves* fleshy or coriaceous, membranous when dry, elliptic or elliptic-oblong, obtuse or shortly acuminate or apiculate at apex, rounded at base or slightly cordate, both surfaces shining when dry,

glabrous above, puberulous or glabrate beneath, margins slightly recurved, 6 to 9 in long, 1.5 to 2.5 in broad, midrib stout and broad, pubescent on both sides, main nerves many, more than 12, but difficult to enumerate, nearly horizontal, at first straight, then branching and anastomosing petiole 2.5 to 5 in long, stout, pubescent. *Umbels* many-flowered (about 10), on short, often strongly tubercular and cushioned, rachises at the ends of stout pubescent axillary peduncles 3 to 10 in long, pedicels stout, pubescent, 2 to 3 in long, buds large, rounded above, produced below in 5 short recurved angles, flowers with corolla dark purplish-brown above, cinnamonaceous beneath, the corona white or pale yellow. *Calyx* membranous, puberulous without, scurfy within, lobes ovate-ovate, 2 in long, scales minute, triangular. *Corolla* leathery, 2 to 3 in in diam, the puberulous tube a little shorter than the ovate triangular acute lobes, which are at first much incurved, afterwards spreading. *Corona* of 5 laterally compressed processes the lower lobes erect, obtuse, deeply 2-cleft and pubescent in the clefts, the upper lobes also erect subulate-acuminate. *Staminal-column* short, broad anther-cells broad, appendages membranous, broadly winged, acuminate, pollen-masses flattened, oblong, truncate at both ends, 0.75 in long, attached by short slender caudicles to the thick, trigonous, horny, brown pollen-carriers. *Style apex* pentagonal, the angles rounded below ridged above, the ridges joining in an acuminate cone. *Follicle* 1, lanceolate acuminate, 8 to 9 in long, 1 in broad pericarp leathery, opening flat, at first puberulous, afterwards glabrous, striate when dry. *Seed*s obovate, flask-shaped, 2 in long, trigonous above, truncate at tip and bearing a silky white coma 2 in long, testa corky, pale brown, albumen copious, cotyledons thick, ovate, cordate at base, 1 in long, radicle 0.75 in long, thick. Hook Bot Mag t 3397, copied in Fl des Serres IV tt 393, 394, Ann de Gand (1848) t 228, Jour Hort Ser 3, XXV 185, Miq Fl Ind Bat II 527, Hook f Fl Br Ind IV 59. *H. splendens*, Maingay MS. *Aschpius Sassuella*, Roxb Fl Ind II 31 (excl syn) ?

MALACCA *Maingay* (K D) 1135 —DISTRIB Borneo (Beccari 4001, Motley 1041)

6 HOYA ELLIPTICA, Hook f in Fl Br Ind IV 58 (1883) A slender twining undershrub, branchlets pale, terete, glabrous. *Leaves* fleshy (?) when fresh, chartaceous when dry, elliptic, obtuse both at apex and base, glabrous on both surfaces and pale, especially beneath, margin hardened, nerve-like, slightly recurved, 1.5 to 2.5 in long, 1 to 1.5 in broad, nerves prominent when dry, midrib slender, main nerves nearly at right angles to the midrib, irregular, 8 to 10 pairs, straight to join a prominent intramarginal looped nerve at 1 to 1.5 in from the

edge, the said intramarginal nerve connected by many cross-nerves with the hardened marginal nerve, reticulations netted, petiole 15 to 25 in long, flattened. *Umbels* racemose, about 8- to 10-flowered, on a short tubercular rachis at the end of a thickened pink peduncle reaching 1 in in length, pedicels slender, 1 to 1.5 in long, puberulous, buds 25 in long, 5-angled, the incurved valvate corolla-lobes forming a central concavity, flowers "white" (Maingay), nearly black when dry. *Calyx* puberulous, pale pink, tube very short lobes ovate-oblong, obtuse, .05 in long, scales minute. *Corolla* 5 in broad when open, glabrous without, sparingly pilose within, lobes obcordate, apiculate, inflexed (when dry). *Corona* of 5 processes, the lower and large lobes suberect, laterally compressed, bladder-like (the interior of the cavity delicately hairy), ovate, slightly apiculate the upper short, flattened, slightly recurved, appressed to and covering the anther. *Staminal-column* attached to the base of the corolla tube, anthers short much inflexed so as to lie nearly horizontal, cells parallel above, divergent and empty below, appendages scarious, acute, pollen masses oblong falcate, pellucid on the outer margin, nearly horizontal, attached by thickened caudicles to the rather large elongate pollen-carriers which are obtuse above and 2-winged below. *Style apex* 5 angled, flattened, with a short central umbo having 5 divergent rays to the angles. *Fruit* not known.

PFRANK *Scortechini* MALACCA *Maingay* (K D) 1137

7 HOYA CORONARIA, Blume Bijl 1063 (1825), and Rumph IV 31, t 182, fig 2 and t 184 (fruit). A stout twining shrub, the upper branches giving out roots on to the bark of trees and probably therefore more or less epiphytic. Branches thick, velvety pubescent the innovations especially so. *Leaves* thickly coriaceous, elliptic elliptic ovate or ovate oblong, shortly acuminate at apex, rounded at base upper surface when dry shining, wrinkled, puberulous especially on the midrib lower surface pale brown, velvety pubescent margins strongly recurved 3 to 4 in long, 1 to 2 in broad midrib stout, impressed above, raised beneath main nerves very obscure, about 5 to 7 pairs nearly horizontal, reticulations not visible petiole thick, velvety, 25 to 75 in long. *Umbels* racemose, rather few flowered, on thick rachises with large rounded tubercles 5 to 15 in long, at the ends of thick lateral velvety peduncles 5 to 75 in long, pedicels velvety, curved, thick, 5 to 1 in long, buds depressed at top, the lobes decurved in a hook, flowers large, fleshy, about 1.5 in in diam, greenish-white changing to ivory-white, then apparently to pink which darkens and becomes speckled with purple (Ridley), the corona white. *Calyx* thick, velvety without, lobes orbicular, 15 to 25 in long, scales subulate. *Corolla* very thick, glabrous within, villous without, lobes triangular

acuminate, cordate at base, 4 in long Corona of 5 spreading processes, horny when dry, the lower lobe nearly hemispherical, concave above, convex beneath, about 25 in long, the upper acuminate, curved far over the anthers Staminal-column short, thick, inserted at the base of the corolla-tube, anthers incurved, their cells parallel above, divaricate and empty below, appendages prominent, scarious, ovate-acute, pollen-masses broadly clavate, attached by means of long slender twisted caudicles to the rather large pollen-carriers which are rounded above and bifid below Style-aper circular, saucer shaped, with a small central umbro and 5 slender rays Follicle 1, 6 to 10 in long, 1.5 to .2 in diam, gibbous at base, subcylindric above, ending in an obtuse point, pericarp very thick, puberulous, striate, the endocarp woody and smooth the follicle at length opening nearly flat Seeds obovate, 4 in long, truncate at tip and bearing a copious white silky coma 2 to 2.5 in long, cotyledons elliptic 2 in long, fleshy, radicle cylindric, 1 in long Miq Fl Ind Bat II 517 Hook f Fl Br Ind IV 58, Ridley in Trans Linn Soc 2nd Ser III 321 *H graniflora*, Bl MSS, Dene in DC Prodr VIII 635 *H velutina*, Wight Contrib 35, Wall Cat 8150, Dene l c

PERANG *Wallach* 8150 (marked "Sillet, but probably in error) *Curtis* 236 DINDINGS *Curtis*, *Scortechini* 1053 PERAK at Gopeng *Scortechini* 2009 at Matang, on sea coast, *Wray* 2710, at Larut, *Kunstler* 3865 (leaves only) *King's Collector* 4116, 6954 MALACCA (*Griffith* 3788 *Mangay* (K D) 1125 PAHANG at Kuala Pahang, *Ridley* SINGAPORE at Serangoon *Ridley* 2731A -DISTRIB Java, Sumatra (*Teysmann* 1171) Borneo (*Motley* 871, *Burbridge*), Celebes, New Guinea (H O Forbes 516, flowers 2 in in diam)

We have not quoted Hook Bot Mag 4969, which in some respects seems to represent more nearly *H obtusifolia* rather than this As in other species, the colour of the flower is either very variable or in doubt Low's drawing in Herb Kew shows pink flowers, while *Scortechini* says they are white, *Kunstler* and *Wray* that they are 'very pale yellow,' and *Mangay* that they are "white or yellowish with purple spots"

8 HOYA SCORTECHINII, King & Gamble, n sp An epiphytic undershrub, rooting at intervals on the bark of trees, branchlets slender, torette, pale brown Leaves thick, fleshy, drying coriaceous, ovate or ovate-lanceolate, acuminate at apex, rounded or cordate at base, both surfaces glabrous, lower minutely glandular, margins recurved, 2 to 3.5 in long, .75 to 1.25 in broad, nerves only visible when dry, midrib thick main nerves 5 to 6 pairs at an angle of 50 to 60 with the midrib, branching early and anastomosing near the margin reticulations transverse, petiole stout, 2 in long Umbels apparently few flowered



on stout (25 in) rachises with small tubercles at the ends of rather long (1.5 to 4 in) slender peduncles, pedicels slender, 5 to 7.5 in long, buds hemispheric, 5 angled, flattened above, 2.5 in in diam. *Calyx* small, lobes ovate, ciliate, membranous, glandular, recurved, 0.3 in long. *Corolla* 5 to 6 in in diam when open, glabrous without, puberulous within, lobes ovate-acuminate, 2 in. long. *Corona* of 5 processes more or less upturned, lower lobes ovate, thick, very obtuse at tip, with a raised ovate ring above and deeply cleft valves below, upper lobe shorter than the anthers, erect, acute. *Staminal column* short, anther cells slightly divergent, appendages scarious, acuminate, pollen-masses thick, oblong, straight on inner side, attached by short caudicles embracing their base to the rather large conical pollen carrier. *Style-apex* 5-lobed, acute at tip. *Follicles* (immature) 1 or 2 very slender, narrow, pericarp very thin, smooth. *Seeds* small, oblong, truncate at tip with a 7.5 in long coma.

PENANG John Scott PERAK Scortechini 464, 1557

John Scott's specimen has rather thinner leaves but this is probably only due to youth. His specimen bears no flowers, only young fruit, so we think it best not to couple his name with the species.

9 HOYA CAUDATA, Hook f Fl Br Ind IV 60 (1883). A twining epiphytic shrub, rooting on trees, branches 1 to 2 in thick with corky rugose bark. *Leaves* thick, fleshy, coriaceous when dry, ovate, acuminate at apex, rounded or cordate at base, both surfaces glabrous, sparsely papillose, margins corrugate and recurved, 3 to 7 in long, 2 to 3 in broad, midrib slender, main nerves 3 to 4 pairs, distant, arching, very faint, reticulations not visible. *Petiole* up to 2.5 in long, very thick, so thick as to appear globose. *Umbels* many flowered on a 5 to 1 in long tuberculate rachis at the end of a thickened 1 in long peduncle, pedicels 5 in long, filiform, flowers white suffused with pink. *Calyx* very membranous, lobes linear lanceolate, glabrous, 0.5 to 0.75 in long. *Corolla* 5 to 7.5 in in diam lobes ovate, long caudate acuminate, silvery-pilose within. *Corona* fleshy lower lobes horizontal, elliptic-ovate, the broadest end outwards, concave above, the upper lobe produced in a long erect subulate spur shorter than the anther tips. *Staminal-column* short, anther wings straight, appendages membranous, long caudate-acuminate, pollen masses flattened, oblong, truncate, attached by cup shaped broad caudicles to the rather narrowly ovate brown pollen-carrier. *Style-apex* 5-angled, with a short conical tip.

MALACCA Maningay (K D) 1128

10 HOYA LATIFOLIA, G Don Gen Hist Diehl Pl IV 127 (1838)

A climbing (probably epiphytic) shrub, branches very stout, smooth lenticellate, giving out slender rootlets occasionally. *Leaves* very thick, fleshy, ovate or oblong-ovate, acute at apex, rounded or cordate at base often slightly peltate, glabrous on both surfaces, dull when dry, margins strongly recurved, shining, 5 to 10 in long, 3 to 7 in broad, midrib with a gland at the base, nerves 3 to 5 from the base, connected at intervals by few irregular cross-nerves, reticulations not otherwise visible, petiole very stout, 25 to 5 in long, articulated to a thick shining cup-like base at the node. *Umbels* racemose, on thick, pitted, up to 1 in long, tubercular rachises at the end of stout 1 to 2 in long peduncles, which are solitary or fascicled in the leaf axils or at the nodes of very long (sometimes 5 ft!) flowering branches, pedicels very slender, puberulous, 25 in long, buds flattened, 5 angular, flowers very small, grey, 35 in broad when open, 15 with the lobes closed. *Calyx* minute, membranous, lobes ovate, acute, 3 in long. *Corolla* small, rotate, pubescent within, lobes ovate, at first incurved over the staminal column afterwards spreading. *Corona* of 5 membranous processes, each consisting of an ovate lower horizontal or slightly upcurved lobe concave above and deeply grooved below, the tip apiculate recurved, and an upper shorter erect lobe with acute tip and a channel behind. *Staminal column* very short, anther cells divergent, appendages membranous, acute. *Pollen* masses oblong falcate, pellucid on the outer margin, attached by short thick caudicles to the rather large 3 lobed pollen carriers. *Style* apex sharply 5 angled, conical apiculate. *Follicle* 1, very slender, 4 to 4.5 in long, 2 in broad, pericarp thin, puberulous. *Seeds* oblong, acute at base, truncate at tip, 25 in. long, bearing a white silky coma 1 to 1.25 in long, cotyledons thick, ovate oblong, 1 in long, radicle as long and broad as cotyledons, flattened. Done in DC Prodr VIII 638, Miq Fl Ind Bat II 521, Hook f Fl Br Ind IV 57. *H. macrophylla*, Wight Contrib 38, not of Blume. *H. polystachya*, Blume Mus Bot Lugd Bat I 45, t 9. Miq l c 522.

PENANG Wallich 8165A PAHANG Kota Glauggi woods, Ridley in Trans Linn Soc Ser 2, III 321 SINGAPORE Manuay (K D) 1124, Lobb, Hullett 621, at Cluney Road, Goodenough 2734—DISTRIBUTION Java, Sumatra

11 HOYA LACUNOSA, Blume Bijdr 1063 (1825) A creeping epiphytic undershrub, rooting at the nodes, branchlets very slender, glabrous. *Leaves* very thick, fleshy, ovate, ovate-lanceolate or lanceolate, acute or acuminate at apex, rounded or attenuate at base, both surfaces glabrous, shining, margins thickened, .75 to 1.75 in long, .5 to .75 in broad, midrib when dry faint, usually glandular at the base, main nerves 2 to

4 pairs, also faint but visible, at right angles to the midrib, straight to join an intramarginal nerve covered by the marginal thickening, petiole thick, very short. *Umbels* axillary, on stout peduncles 75 to 15 in long, which end in a thickened rachis of cushion-like bracts often 25 in long, pedicels slender, 25 to 35 in long, buds globose, flowers white, usually tinged with yellow, scented. *Calyx* rotate, membranous, lobes as long as tube, 0.25 in long, obtuse. Scales minute. *Corolla* 25 in in diam when spread out, pubescent or scurfy within, lobes triangular, recurved. *Corona* membranous, of 5 processes, forming a concave-sided cone, the lower lobe of each process spreading or upcurved, ovate, the upper lobe ovate-acute, exceeding the anther. *Staminal-column* short, anthers minute with very thin membranous acute appendages, pollen-masses oblong-falcate, reticulate, compressed, attached by erect thickened cup shaped caudicles to the small pollen-carriers. *Style* apiculate, rather deeply lobed, tip conical. *Ovules* smooth. Dene in DC Prodr VIII 638 Hassk Cat Bogor 126 and Flora Bot Zeit (1845) 280 Miq Fl Ind Bat II 525 Hook Bot Mag 4826, 5272 Hook f Fl Br Ind IV 55. *Otostemma lacunosum*, Blume Rumph IV 30, t 184, fig 2 and Mus Bot Lugd Bat I 59, t 11.

PENANG *Michado* 101 *Curtis* PERAK *Scortechini* 1558 *Kinny* s *Collector* 3476 MALACCA *Maingay* (K D) 1133 (part) SINGAPORE at Rawang, *Ridley* 7569 - DISTRICT Sumatra, Java, Borneo

12 HOYA DIVERSIFOLIA, Blume Bijl 1064 (1826) A climbing glabrous shrub, branches flexuous, smooth, brown branchlets paler the bark very thin. *Leaves* fleshy, very thick broadly elliptic or obovate, obtuse or apiculate at apex, rounded at base both surfaces glabrous, dull, margins recurved, 2 to 4 in long, 1.5 to 2.5 in broad nerves only visible when dry, midrib broad, main nerves about 4 to 6 pairs, rather irregular, at about 60° with the midrib, soon branching, reticulations very indistinct, petiole 25 to 5 in long, thick. *Umbels* many-flowered, on stout thick 25 to 75 in long tubercular rachises at the ends of very thick 5 to 2.5 in long peduncles, which are lateral one to each pair of leaves, pedicels slender, 5 in long, buds flattened with 5 rounded angles, flowers 25 to 35 in broad white or rose coloured with pink corona (yellowish-white (Maingay)). *Calyx* membranous, lobes elliptic-obtuse, usually ciliate at the tips, 0.75 in long, scales apparently none. *Corolla* glabrous without, puberulous within, lobes cordate-acuminate. *Corona* of 5 processes attached to the bases both of the staminal-column and of the corolla-tube, lower lobe of each process orbicular or ovate, concave above and with a small central boss, 2 winged below, the wings connivent, upper lobe erect, triangular-acute, shorter than the anther-appendages. *Staminal column* very short,

anther-cells parallel above, divergent and empty below, appendages scarious, acute or acuminate, pollen-masses oblong, truncate at top, thin on the outer margin, attached by very short thick caudicles to the rather long obconical pollen carriers *Style-apex* 5-angled, depressed, with a short conical apiculus *Follicles* sublinear, falcate, 6 in long, 75 in broad, pericarp thick, apparently 25 in or more *Seeds* oblong, 25 in long Dene in DC Prodr VIII 636, Miq Fl Ind Bat II 518, Hook f Fl Br Ind IV 61 *H. orbiculata*, Wall in Wight Contrib 36, Wall Cat 8151, Dene l c 635, Miq l c 519 "*Sussuela esculenta*," Rumph Herb Amb V 467, t 175, f 1

PENANG at Pulau Boetong, *Curtis* 928 PERAK Hany 2718 *Scortechini* 118 MALACCA *Griffith* 3787, *Maingay* (K D) 1130 PAHANG at Pekan, *Ridley* 1619 SINGAPORE *Ridley* 1626, 2733—DISTRIB Buina (at Proinc, *Wallich* 8151), Java, Amboyna

13 HOYA MAINGAYI, Hook f in Fl Br Ind IV 62 (1883) A trailing epiphytic shrub, sending out rootlets along its stem, nodes much swollen branches stout branchlets terete, pale brown *Leaves* very thick, fleshy, coriaceous when dry, elliptic lanceolate or oblanceolate, shortly acuminate at apex, long acuminate narrowed at base, both surfaces glabrous, dull when dry, margins recurved, 7 to 9 in long, 25 to 35 in broad midrib slender but prominent when dry, with a gland or enlargement at the base above the petiole, main nerves about 5 pairs, prominent when dry, especially above, at about 60° to 70° with the midrib, nearly straight at first, then branching and forming a rough intramarginal nerve, secondary nerves few, reticulations irregular distant, petiole thick, 25 to 5 in long *Umbels* many flowered (20 to 30), on a very short tubercular rachis at the end of a thick peduncle 3 to 1 in long pedicels very slender, 5 to 1 in long buds obconical, pentagonal, concave above, 25 in broad flowers pale pink, corona white *Calyx* small, pale pink with red tips, red-scarious-punctate without, glabrous within, lobes 03 in long, obtuse, ciliate, no scales *Corolla* 5 to 75 in broad when open lobes triangular, villous within with pale crispate hairs *Corona* of 5 processes, outer lobe ovate, acute, horizontal, bi-cleft, concave above with central ridge, 2 valved below, upper of a short acute tooth shorter than the anther-tip *Staminal-column* short, attached at the base of the corolla-tube, anther-cells divergent, appendages scarious, acuminate, incurved, pollen-masses flattened, oblong-falcate, waxy, attached by short caudicles embracing their bases to the conical pollen-carriers *Style-apex* 5-angled, angles acute, tip conical *Fruit* not known in the ripe state, when immature 4 to 5 in long, 25 in broad, acuminate, tip recurved pericarp smooth

PERAK *Scortechini* 584 MALACCA *Maingay* (K D) 1136

14 HOYA PARASITICA, Wall in Wight Contrib 37 (1834), and Cat. 8159 A stout climbing epiphytic shrub, creeping over the trunks and branches of trees and giving off roots from every part (Roxb), branches smooth, pale, fleshy Leaves fleshy, thick, very variable, ovate or elliptic or lanceolate, acute or acuminate at apex, rounded or almost cordate to cuneate at base, glabrous on both surfaces, margins recurved, 3 to 7 in long, 1.5 to 3 in broad, 5-nerved from the base, the outermost pair thin, forming loops near the margins, from the sinuses of which transverse nerves join them to the middle pair, midrib with several transverse nerves also joining the middle pair, which have one or two loops near the tip, all raised on both surfaces when dry, as are the other irregular reticulations, petiole very thick, 25 to 1 in long Umbels many-flowered, racemose, on short or long (reaching 4 in), thick (often nearly 25 in in diam), tubercular rachises at the ends of stout 1 to 3 in long axillary or lateral peduncles which are solitary or in pairs, pedicels slender, 5 in long or longer, buds turbinate, 5 angled, flowers pearly white with a pink centre, very fragrant (alyx membranous lobes ovate, acute scales very small Corolla 3 in broad, lobes cordate, glabrous, inflexed, with the corona processes projecting between them Corona of 5 membranous 2-lobed processes, which are horny and shining when dry, and white with pink tips, the lower lobes ovate, spreading, grooved beneath, the upper lobes erect, acute Staminal-column short, anther cells divergent, appendages membranous, acute, pollen-masses oblong, truncate, thin on the outer margin, attached by short thick caudicles to the conical pollen carriers Style-apex membranous, 5 angled, conical-apiculate Fruit not known Wight Ic 587, Dene in DC Prodr VIII 637, Hook f Fl Br Ind IV 57, Prain Beng Plants 700 *H. Hookeriana*, Wight Contrib 37, Wall Cat 8153, Dene l c 636 *Hoya* sp, Wall Cat 8153 *H. pallida*, Lindl in Bot Reg t 951, Paxt Fl Gard t 26, copied in Lemane Jaid Fleur t 64 *Asclepias parasitica*, Roxb Hort Beng 20, and Fl Ind II 42, Wight Ic t 587

KIDAH Kunstler 1829 PENANG at Waterfall, Curtis PERAK at Sungei Larut, Wray 2273, at Bake Kuran, Scortechini 1626, at Ulu Bubong, King's Collector 10316 MALACCA Griffith, Mangay (K D) 1126, 1132, 1138 PAHANG Praman, near Pekan, Ridley in Trans Linn Soc Ser 2, III 321 SINGAPORE Ridley 1796, 8070 — DISTRIK India (Sikkim, Assam, Sundarbans, Chittagong, Andaman Islands)

Kunstler describes the colour of the flowers as "white with a pink centre" or "waxy white with a purplish tinge," but Wray says it is "pale greenish yellow with a few small spots of crimson" Roxburgh, who had it in cultivation, says the

flowers are "pearl-coloured," and this is what the Fl Br Ind says of the corolla, giving the corona processes as 'white with pink at the junctures' Maingay (MS Notes IV, p 41) says, "petals white, faintly greenish towards the tips, corona white. These remarks, for what seems clearly to be the same plant, explain the difference between Lindley's and Paxton's drawings alluded to in the Fl Br Ind. As remarked in Fl Br Ind, *H. cinnamomifolia*, Hook Bot Mag 4347, from Java, "has very similar flowers and leaves" But for the corolla being green and the corona purple in that fig, we should be inclined to place it under *H. parasitica*

15 HOYA CORIACEA, Blume Bijl 1063 (1826), and Rumph IV t 187 A climbing shrub, nearly glabrous, branches shining, smooth, angled when dry, branchlets pubescent. Leaves coriaceous (Blume) or fleshy (Wight), chartaceous when dry ovate or ovate-lanceolate, acute or acuminate at apex, rounded at base glabrous and more or less shining on both surfaces margins slightly recurved, 3 to 6 in long, 1 to 2.5 in broad midrib slender, raised on the lower surface, sometimes with one or more glands just above the petiole, main nerves distinct, 4 to 6 pairs, at about 40 to 50 with the midrib, straight and then branching and anastomosing with a looped intramarginal nerve reticulations netted, prominent, petiole slender in young leaves, thick in old ones, 25 to 75 in long Umbels racemose, many-flowered (30 to 40), on stout tubercular rachises 25 to 75 in long and 1.5 to 2 in thick at the ends of stout lateral puberulous peduncles 2 to 5 in long, pedicels slender, 75 to 125 in long buds flattened, 5 angled, 5 in broad, 15 in high, flowers straw-coloured, yellow or reddish, the corona white Calyx pubescent without tube short lobe linear, sparsely ciliate, 15 in long, scales minute Corolla 75 in in diam when expanded lobes triangular ovate, acuminate, villous within and grey when dry ("hairs like collapsed hollow tubes" -Wight), at first incurved over the column, at last recurved Corona of 5 spreading processes, shining and horny when dry lower lobes ovoid, acute, inflated, 2 winged below with the wings connivent, upper lobes erect, acute, connivent with but shorter than the anthers Staminal-column short, anther-cells parallel above with divergent empty ones below appendages scarious, ovate-acute, pollen-masses slender, oblong-falcate, straight and thickened on the inner edge, attached by spatulate caudicles with a raised margin above to the very narrow slender pollen carriers Style-apex 5-angled, rather thick, depressed above with a small umbo Follicle 1, 4.5 to 5 in long, 5 to 75 in. broad, lanceolate, obtusely beaked, pericarp very thick, woody, rugose Seeds oblan-ceolate, thick, 25 in long, truncate at tip and bearing a silky coma 1.25 in long, cotyledons elliptic, fleshy, 15 in. long, radicle cylindric, .075 in long Mus Bot.Lugd-Bat I 44, Miq Fl Ind Bat II 521, Dene in DC Prodr VIII 638, Bot Mag t 4518; copied in Fl des

Serres t 578, Paxt Fl Gaid I 77, fig 55, Lemaire Jard Fleur t 37  
 Hook f Fl Br Ind VI 61 Schum in Engl & Prantl Pflanzenfam  
 IV 2, 290, fig 88 A, B *H Brunoniana*, Wight Contrib 37, Wall Cat  
 8163 Dene l c 636

PERAK *Scortechini* 533 MALACCA *Griffith*, *Mangay* (K D) 1181,  
 1134 PAHANG at Pekan, *Ridley* 2171 — DISTRIB Java, Borneo  
 (*Motley* 1121 *Beccari* 3926)

16 HOYA FORBESII, King & Gamble, n sp A climbing shrub,  
 rooting on trees and probably epiphytic, branchlets somewhat angular,  
 lenticellate, with pale brown shining bark *Leaves* coriaceous when  
 dry, elliptic oblong or -obovate, shortly and bluntly acuminate at apex,  
 rounded at base upper surface glabrous, shining, lower surface  
 minutely papillose, both pale brown when dry margins somewhat  
 recurved 4 to 7 in long, 2.5 to 4 in broad midrib strong, much  
 raised beneath, bearing on the upper surface a gland just above the  
 petiole, main nerves about 7 pairs, irregular but usually at 40° with  
 the midrib more or less curved and branching secondary nerves  
 frequent, especially near the top between the main nerves reticula-  
 tions transverse, irregular, clearly visible only on the upper surface  
 petiole very thick, bent, articulate in the middle about 5 in long  
*Umbels* apparently few-flowered, on 7.5 in long rachises with small  
 tubercles at the end of short (about 7.5 in) peduncles, pedicels filiform  
 5 in long, puberulous buds flattened, 2.5 in in diam, flowers having  
 greyish white corollas with purple tips (*Forbes*) *Calyx* membranous  
 lobes about twice as long as tube, ovate, ciliate, puberulous without  
 no scales *Corolla* 4 in in diam, puberulous without lobes broadly  
 triangular ovate acute incurved *Corona* of 5 inflated processes  
 closely adnate to the staminal column, lower lobes horizontal, narrow  
 oblong, slightly ridged above, 2 valved below, nearly 1 in long, upper  
 lobe a minute erect tooth *Staminal column* short, anthers incumbent  
 over the style-apex cells divergent, appendages acute, scarious, pollen  
 masses flattened, falcate, attached by short straight caudicles to the  
 narrow pollen carriers *Style apex* very thin, deeply 5 lobed with a  
 conical tip *Fruit* not known

PERAK *Scortechini* 1679, 1680 — DISTRIB Sumatra, on Kaba  
 Volcano, 5000 feet (*Forbes* 2896A)

17 HOYA FINLAYSONII, Wight Contrib 38 (1834) A climbing  
 shrub stem stout, branchlets pale brown, smooth, lenticellate, flexuose  
*Leaves* coriaceous, thick, hard and tough when dry, ovate or oblong  
 lanceolate, obtusely acuminate at apex, more or less rounded at base  
 both surfaces at first minutely papillose, afterwards glabrescent or  
 dotted, when fresh greenish red above, dark red beneath margins with

a wavy nerve close to the edge, 5 to 7 in long, 1.5 to 2.5 in broad, nerves very prominent and raised on both surfaces when dry, midrib stout, with a large gland just above the petiole, main nerves about 5 to 7 pairs besides the marginal one, at about 60° with the midrib, nearly straight to join a second and prominent looped intramarginal nerve, secondary nerves many, irregular, reticulations irregular, netted, petiole very thick, 2.5 to 5 in long. *Umbels* very many flowered, without any prominent tubercular rachis, peduncles 7.5 to 2 in long, rather slender, pedicels almost capillary, 5 to 7.5 in long, buds 5-angled, hemispheric below, flattened and depressed above, 2.5 in across, flowers with cream-coloured and pink corolla and waxy-white corona. *Calyx* thin, nearly hyaline, with a few brown veins, lobes obtuse, 0.5 in long, pubescent within. *Corolla* 4 in broad when open, pubescent within, lobes triangular ovate acute, usually inflexed. *Corona* of 5 spreading inflated processes, the lower lobes ovate acute, concave at first, afterwards more or less ridged, 2 winged below, the upper lobe erect, short, acute. *Staminal column* short, attached to the top of the corolla-tube, anther cells divergent, appendages short, rounded, scarious, pollen-masses oblong-falcate, obtuse at tip, attached by very short thick caudicles to the conical pollen carriers. *Style-apex* 5 angled, with 5 rays leading to a short apiculus. *Follicle* 1, very slender, 7.5 in long, 2.5 in broad, straight, acuminate, pericarp thin, glabrous, striate. *Seeds* cylindric, 3 in long, acute at base, truncate at tip, and bearing a 1 to 1.5 in long silky coma, testa very thin, brown cotyledons fleshy, lanceolate, 1.5 in long, radicle cylindric, 1 in long. Wall Cat 8166, Dene in DC Prodr VIII 638, Miq Fl Ind Bat II 527, Hook f Fl Br Ind IV 62.

PERAK Wray 2724, King's Collector 4800 SINGAPORE Wallich 8166 DISTRIB Siam? (Finlayson)

The specimens in the Kew Herbarium have no flowers, but we see no reason to doubt the identification of the leaves of our specimen.

18 HOYA RIDLEYI, King & Gamble, n. sp. A twining epiphytic undershrub, rooting at intervals on the bark of trees, branchlets pale, terete, lenticellate, rather slender when dry. *Leaves* fleshy, coriaceous when dry, variable, ovate or ovate-oblong or oblong-lanceolate, acute at apex, rounded or narrowed or sometimes cuneate at base, both surfaces glabrous, margins recurved, 3 to 5 in long, 1.25 to 1.75 in broad, midrib slender, faint, as are the nerves generally, even when dry, main nerves about 5 to 6 pairs, the lowest pair starting from the base and curving along the margin, the others nearly at right angles, quickly branching and joining the marginal one, reticulations irregularly



netted; petiole very thick, .25 to .75 in. long, broad at the junction with the blade. *Umbels* many-flowered, on .25 to 1 in. long rachises with small tubercles at the ends of stout lateral peduncles 1 to 4 in. long; pedicels slender, .5 to .75 in. long, buds flattened, .25 in. in diam. *Calyx* papillose without, lobes oblong, acute, .06 in. long; no scales. *Corolla* rugose without, puberulous within; lobes cordate, almost 3-pointed, points acuminate, especially the end one. *Corona* of 5 shining inflated processes; lower lobe horizontal, ovate, sharply acute, concave on the upper surface with a median ridge, 2-valved below, upper lobe on acute erect tooth, shorter than the anthers. *Staminal-column* short, inserted on the tube of the corolla, wings of filaments ear-like, anther-cells divaricate, appendages scarious, acuminate, incurved, pollen-masses flattened, oblong, truncate at top, attached by short thick caudicles to the 3-lobed rounded rather large pollen carriers. *Style-apex* membranous, 5-angled, tip long conical. *Fruit* not known.

KEDAH: at Pulau Songong, *Curtis* PENANG *Curtis*, at Pulau Tikus, *Ridley* 9476. PERAK at Maxwell's Hill, *Ridley* 5519. SINGAPORE at Ganga Road, *Ridley* 10358

To this species, also, probably belongs *Curtis* 2355 from Kuala Lumpur, Selangor, which has, however, smaller leaves, but no flowers.

19. HOYA PARVIFLORA, Wight Contrib. 37 (1834). A twining, slender, epiphytic undershrub, rooting on the stems and branches of trees, branchlets very slender, terete. *Leaves* thick, coriaceous, lanceolate, acute both at apex and base, glabrous on both surfaces, margins slightly recurved, 2 to 4 in long, .35 to .75 in broad, midrib slender, obscure, main nerves very faint even when dry, 5 to 6 pairs, very acutely (about 10°) spreading from the midrib, the lowest pair even more so, reticulations not visible, petiole about .15 in long, thick. *Umbels* many-flowered (30 to 40), racemose, lateral or terminal, peduncle rather stout, 1.5 to 1.75 in. long, ending in a thickened strobilate rachis often 1 in. long with minute imbricate bracts, pedicels slender, .25 to .5 in. long, buds globose, depressed, flowers many, about 15 to .25 in in diam., apparently white. *Calyx* membranous, very small, lobes ovate. *Corolla* rotate, revolute, villous within with unicellular soft hairs, lobes triangular. *Corona* of 5 membranous horizontally spreading processes, forming a shallow cone, lobes longitudinally folded, bifid at apex. *Staminal-column* very short, anthers connivent over the style-apex, with very thin membranous appendages, pollen-masses very minute, flattened, oblong-truncate, attached by minute cup-shaped caudicles to the triangular pollen-carriers. *Style-apex* with a conical tip. *Follicles* very slender, 4 to 5.5 in. long, .2 in. broad, pericarp thin,

smooth. *Seeds* oblong, .25 in. long, not winged, truncate at tip, and bearing a 1 in long white silky coma, testa very thin, pale brown, smooth, cotyledons oblong, .05 in long, radicle cylindric, .075 in long Wall Cat 8156 A, Dene in DC Prodr VIII 637, Hook f Fl Br Ind IV 54

PENANG at Balik Pulau, *Curtis* 689, on Mount Elvira, *Md Haniff* for *Curtis* —D STRIB Tenasserim (*Wallich* 8156 A)

20 HOYA REVOLUTA, Wight MS, Hook f in Fl Br Ind IV 55 (1883) A twining epiphytic undershrub, occasionally rooting from the nodes, branchlets slender, terete, glabrous *Leaves* very thick and fleshy, ovate or ovate-lanceolate, acuminate at apex, rather abruptly acute and attenuate at base, both surfaces glabrous, very pale when dry and more or less shining, margins strongly recurved 1.5 to 3 in long, .75 to 1 in broad midrib and main nerves (3 to 4 pairs at about 60°) only occasionally, and then very faintly, visible when dry petiole very thick, 1 to 1.5 in long *Umbels* on a 2 to 4 in long peduncle, ending in a thick scabrous rachis 5 in long with cushion-like minute bracts, pedicels of various lengths, .25 to 1 in long, filiform buds small, round, depressed, 1 in in diam, flowers small, pink, or white with pink tips *Calyx* rotate lobes oblong, obtuse, .02 in long, scales small, flat *Corolla* 1.25 in in diam, with a slight raised fold at the mouth of the tube, lobes triangular, as long as tube *Corona* of 5 membranous processes united into a conical vertically 5 lobed column, each again lobed and produced upwards in an acute point *Staminal column* very shortly stalked, anthers inflexed, appendages acuminate, membranous, pollen masses oblong, obtuse, attached by short thick caudicles to the small pollen carriers *Style* apex deeply 5 lobed, with a conical apiculus *Fruit* not known *H. ovalifolia*, Wall Cat 8160 B

PERAK in Larut 3962 and at Relau Tujoi, *Wray* 1902 *Scortechini* MALACCA *Griffith*, *Mangay* (K D) 1127, 1129, 1123 (part) SINGAPORE *Wallich* 8160 B

*Wray* No 3962, from Blanda, Mabok Plains Larut is a fruiting specimen which may possibly belong to *H. revoluta* Wight, but the leaves are lanceolate and not ovate, and the flowers are described as yellow instead of pink The following is the description —

A climbing undershrub, branches terete, pale brown *Leaves* fleshy, coriaceous when dry, lanceolate acuminate at apex narrowed at base, glabrous on both surfaces, margins strongly recurved, 1.5 to 2 in long .5 to .75 in broad, midrib and main nerves only very faintly visible when dry the latter curving upwards at an acute angle, petiole very thick, .25 in long on a much enlarged base *Flowers* not seen *Follicle* lanceolate, poniard shaped, acutely angled, .25 in long, .4 in broad, pericarp thick *Seeds* very small, 1 in long, trigonous oblong with a broad truncate apex, bearing a white silky coma 1 to 1.5 in long, testa thin brown albumen rather thick,

cotyledons elliptic 02 in long; radicle 01 in long, flattened perpendicularly to the cotyledons

21 HOYA PLICATA, King & Gamble, n sp A climbing, probably epiphytic, undershrub, branchlets rather stout, terete, yellowish *Leaves* fleshy, coriaceous when dry, ovate-lanceolate, acuminate at apex, acute at base, smooth and glabrous on both surfaces, margins slightly recurved, 3 in long, 1 in broad, midrib very faint and then only when dry, remaining nerves invisible, petiole stout, 25 in long, flattened *Umbels* many-flowered, racemose, on stout tubercular rachises, 25 to 5 in long at the ends of stout 75 to 1 in long peduncles pedicels fleshy, broadly flattened when dry, 1 in long, buds 5-angled, flattened (*calyx* small, lobes ovate, acuminate, hyaline, scales subulate *Corolla* 4 in broad, with a raised 5-angled villous ridge in the tube above the insertion of the staminal column, puberulous on both surfaces lobes triangular, 1 to 15 in long *Corona* of 5 shining horny processes attached to the backs of the anthers lower lobe ovate, obtuse or bifid at apex, with a broad fold on the upper surface upper lobe erect, acuminate, as long as the anthers *Staminal column* short, anther cells parallel, appendages scarious, acuminate, pollen masses flattened, granular, thin on the margin, truncate at top, seated on the face of spatulate horizontal caudicles, which connect them with the rather large lobed pollen-carriers *Style-apex* 5-angled, fleshy, with a short conical apiculus *Fruit* not known

PERAK at Maxwell's Hill, 3000 ft, *Scortechini* 323

22 HOYA CAMPANULATA, Blume Bijdr 1064 (1825) A small twining shrub branches fleshy branchlets pale brown and shining when dry, the bark scaling off *Leaves* fleshy and bright green when fresh coriaceous when dry, elliptic-oblong, acuminate at apex cuneate or attenuate, sometimes rounded at base both surfaces glabrous more or less shining, pale when dry margins recurved 25 to 65 in long, 1 to 25 in broad midrib stout, raised below, impressed above when dry, with a rounded gland at the base above the petiole main nerves 6 to 7 pairs, straight to meet, often at scarcely more than half way to the edge, a prominent (when dry) looped intramarginal nerve, secondary nerves few, similar reticulations many, irregular, prominent, and raised above when dry petiole 25 in long, stout *Umbels* about 16 to 20 flowered, peduncles stout, 1 to 2 in long, the bracteate portion 25 to 5 in long, pedicels very slender, 1 to 125 in long, buds globose, depressed flowers cream-coloured (*calyx* lobes membranous, hyaline, subulate *Corolla* glabrous, about 1 to 15 in broad or broader, lobes ciliate, boat-shaped, 6 in long, scales very short, apiculate *Corona* of 5 processes lower lobes of spreading spurs 15 to 2 in long

smooth, shining, horny when dry, upper lobes somewhat similar, erect *Follicles* straight, cylindric, 6 to 8 in long, 2 in broad, pericarp smooth, green with white stripes when fresh *Seeds* oblong, obspathulate, 3 in long, 1 in broad, with a short wing at the base, the tip truncate with a white silky coma 1 to 1.5 in long, testa very thin, smooth, cotyledons oblong, 1.5 in long, radicle cylindric, 1 in long Wall Cat 8171, Dene in DC Prodr VIII 633, Miq Fl Ind Bat II 513, Hook f Fl Bt Ind IV 62 *H. campanulata*, Blume Bijdr 1064, Lendl Bot Reg (1847) t 54, Hook Bot Mag t 4545 *Cystidanthus campanulatus*, Hassk Cat Hort Bog 126, Blume Mus Bot Lugd-Bat I 57, Miq l c 515 *Physostelma Wallichii*, Wight Contrib 40, Wall Cat 8171 Dene in DC l c, Miq l c 513, Hook f Fl Bt Ind IV 62 *P. ? campanulata*, Dene l c

PERAK at Relau Tujoi, Wray 1841, 3139, 4014, 4024, *Scortechini* 171, 336, at Bujong Malacca, Ridley 9712 *Kny's Collector* 2587, 3457, 3819 SINGAPORE Wallich 8171 — DISPERIB Sumatra, Java (*Forbes* 416), Borneo (*Haviland* 1971)

A specimen of Forbes's from Sumatra has flowers quite twice as large as those from the Peninsula, but the structure is the same. He says, "Flowers cream white with a flush of rose purple, very fragrant." The description of the follicles is taken from those sent by Wray with his No 1841 but as they are not attached to the plant and we have seen no others for comparison we do not feel quite sure of their identification.

23 HOYA WRAY, King & Gamble, n sp. A slender creeping epiphytic undershrub, rooting on the branches of trees. Stems slender, very rough when dry. *Leaves* fleshy, thinly coriaceous when dry, lanceolate, obtuse and glandular apiculate at apex, long attenuate at base. Upper surface glabrous smooth, lower minutely papillose, both greyish when dry. Margins recurved, 3.5 to 4 in long, 1 to 1.25 in broad, midrib slender, broadened at base, main nerves very inconspicuous even when dry, about 4 pairs, at about 30° with the midrib. Reticulations not visible, petiole very thick, rugose, jointed at the junction with the blade. *Inflorescence* not seen, rachis minutely tuberculate, pedicels slender, 7.5 to 1 in long, scurfy. *Calyx* hyaline, papillose without, tube short, lobes linear-oblong, 0.5 in long, scales subulate. *Corolla* campanulate rotate, 3 in broad when open, villous within with cellular hairs, margins fimbriate crispate, lobes very short, triangular. *Corona* of 5 processes, attached above the filament tube, horny and yellow when dry, lower lobe a slightly upcurved linear-lanceolate ridged spur, upper similar, erect, dorsally flattened, longer.

than the anthers *Staminal-column* with filament-tube free from the corona, otherwise short, anthers short, cells parallel, appendages scarious, ovate, curved over the style-apex, pollen-masses flattened, oblong, obliquely truncate with membranous margins, attached by broadly inflated cup-like caudicles to the conical pollen-carriers *Style-apex* 5-angled, thick, concave above with a conical apiculus *Fruit* not seen

PERAK at Gunong Batu Pateh, 4300 ft, *Wray* 371

## 28 DISCHIDIA, Br

Herbs or undershrubs, usually epiphytic, climbing and rooting on trees or pendulous from them, sometimes almost leafless *Leaves* usually opposite, fleshy, sometimes converted into pitchers (*ascidia*), sometimes convex and sessile, rugose or bullate *Flowers* very small, often minute white yellow or red in axillary racemose or umbellate cymes or fascicles the rachis short, thick, tuberculate peduncles stout *Calyx* small, 5 partite, membranous, with 5 glandular scales *Corolla* campanulate tubular or urceolate the tube ovoid or globose or cylindric, the mouth usually contracted, lobes 5, thick, valvate *Corona* staminal, of 5 membranous processes, adnate to the back of the staminal column, erect, the tips entire, notched or bifid or with incurved or recurved arms, sometimes none or replaced by a corolline corona (Subg I CONCHOPHYLLUM) *Staminal column* very short filaments connate in a tube anthers erect, with membranous appendages pollen masses 1 in each cell compressed, waxy, attached by long curved caudicles, usually of cornucopia shape, to the hard oblong pollen carriers, caudicles in *D. coccinea* very short *Ovary* of 2 carpels styles short, style apex flat or with a conical sometimes capitate tip *Fruit* of 2 or 1 small slender or thick acuminate follicles pericarp smooth *Seeds* very small, flask shaped, tipped with a long silky coma

DISTRIB About 50 species in tropical India, the Malay Peninsula and Archipelago, the Philippine Islands, New Guinea and Australia

*Staminal corona* absent (Subgenus I CONCHOPHYLLUM) —

*Corolla* with a corona like a toothed hanging fold, leaves of two kinds — (1) orbicular, flattened (2) reniform markedly convex and bullate, under 75 in long and 1 in broad

1 *D. astephana*

*Corolla* with a corona like a thickened undulate fold, leaves of one kind (so far as known), reniform, slightly convex and bullate, usually over 1 in long and 1.5 in broad

2 *D. depressa*

*Staminal corona* present, membranous, erect, with incurved or recurved arms (Subgenus II LUDISCHIDIA) —

Leaves sessile, usually reniform, convex above closely applied to the tree trunks or branches (Sect 1 *CORIARIA*) —

Leaves not bullate flowers white tipped with lilac 3 *D. elliptica*

Leaves strongly bullate flowers scarlet tipped with lilac 4 *D. coccinea*

Leaves partly or wholly converted into pitchers (ascidia) (Sect 2 *ASCIDIARIA*) —

Ordinary leaves orbiculate up to 1 in in diam pitchers 2 to 3 in long oblong curved more or less smooth 5 *D. Rafflesiana*

All leaves (so far as known) converted into subreniform compressed rugose pitchers about 2 in in diam 6 *D. complanata*

Leaves normal not (so far as known) converted into pitchers or convex and sessile (Sect 3 *NORMATA*)

Corona processes bifid emarginate or depressed above lobes incurved

Lobes of corona processes narrow

Lobes of corona processes horizontal or incurved leaves thick fleshy linear oblong or spatulate 7 *D. benghalensis*

Lobes of corona processes curved downwards spatulate leaves flat orbicular papillose beneath 8 *D. Nummularia*

Lobes of corona processes broad

Leaves ovate glabrous not lacunose corolla tube merely villous at the throat within 9 *D. allida*

Leaves ovate often hirsute lacunose corolla tube villous at the throat within and with a ring of hairs half way down also 10 *D. hirsuta*

Corona processes rounded or semilunar above lobes incurved usually somewhat twisted

Corolla tube under 1 in long lobes short glabrous or villous within

Corolla urceolate tube globose lobes villous within leaves lanceolate or ovate lanceolate 2.5 to 4 in long 7.5 to 12 in broad corona processes extremely thin 11 *D. acutifolia*

Corolla campanulate lobes glabrous within leaves ovate 1.5 to 2.5 in long 1 to 1.7 in broad petiole flattened 12 *D. confertifolia*

Leaves ovate lanceolate 1.5 to 3 in long 7 to 1 in broad petiole not flattened 13 *D. monticola*

Corolla tube over 1 in long lobes elongate villous within —

Corolla urceolate gradually contracted at the throat tube 12 in long leaves ovate lanceolate 2 to 2.5 in long 14 *D. S. orthoceras*

Corolla tubular 3 to 4 in long contracted and again slightly swollen leaves ovate or ovate lanceolate 7.5 to 12 in long 15 *D. tubuliflora*

#### SPECIES OF WHICH LEAVES ONLY KNOWN

Leaves elliptic or elliptic ovate 1.5 to 3 in long 7.5 to 1 in broad 16 *D. Deschampsii*

1 *DISCHIDIA ASTEPHANA*, Scootchini MS in Herb Cale A slender creeping epiphytic herb, closely appressed to and rooting on the trunks and branches of trees, stems minutely scabrous-papillose and hirsute. *Leaves* fleshy, sessile, appressed to the stem, dark red beneath, of two kinds (1) orbicular villous, papillose, 25 to 35 in diam, midrib slender main nerves about 2 pairs, very obscure, and (2) reniform, very obtuse, upper surface convex bullate, lower concave with broad pits, papillose with minute annular papillae, strigosely hirsute, 5 to 75 in long, 75 to 1 in broad, nerves visible on the under surface only, irregular, branching, central one (midrib) thick. *Umbels* few flowered, on a thick tubercular rachis 25 in long at the end of a thick peduncle somewhat shorter pedicels 1 in long, angled, buds 5 angled, conical, 15 in long flowers white. *Calyx* membranous lobes oblong obtuse ciliate, hirsute beneath 05 in long, scales minute. *Corolla* urceolate tube 5 angled, 125 in long, contracted at the mouth furnished within with a ring of stiff hairs below the mouth, and about half way down a corolline corona consisting of a reflexed membranous hanging annular fold with 5 bilobed teeth, otherwise glabrous lobes ovate, 025 in long, erect, pubescent within. *Staminal corona* none. *Staminal column* conical, attached to the base of the corolla tube filament-ring short anther wings horny, large, 2-folded, spreading outwards anthers erect, cells parallel appendages very thin acuminate connivent pollen masses oblong or clavate truncate, granular seated on rather long caudicles with cup like apex which connect them with the large oblong shining pollen carriers. *Style* apic long conical. *Follicle* 1, lanceolate, 125 to 175 in long, acuminate pericarp very thin, opening out flat and 2 keeled placenta membranous. *Seeds* not seen.

PERAK at Bujong Malacca, Scootchini 1897. SILLANGOR at Bukit Hitam, Ridley 6570 (in part)

This very interesting species is closely allied to *Conchophyllum imbricatum*, Bl., the "Pustula arborum" of Rumph. Herb. Amb. V. 473 t. 175 fig. 3. Beccari, in *Malacm.* II. 258 maintains Blume's genus *Conchophyllum* characterized by the absence of a staminal corona. As however, in all other respects the species seems to us to bear the characters of *Dischidia*, we have preferred to retain it in that genus as was done by Scootchini whose manuscript description in the Calcutta Herbarium has been followed closely.

2 *DISCHIDIA DIPRESSA* C. B. Clarke, MS in Herb Kew. A slender creeping epiphyte, closely appressed to and rooting on the stems and branches of trees, stems very slender, many rootlets extremely numerous. *Leaves* fleshy, sessile orbicular reniform, flattened or somewhat convex and slightly bullate on the upper surface, glabrous or

very slightly papillose on the lower surface, and with small pits, 1 to 1.25 in long, 1.5 to 1.75 in broad, midrib stout, main nerves 2 to 3 pairs, the lowest pair from the base spreading horizontally, the others slightly acutely and early branching. *Inflorescence* not seen. *Calyx* very thin, hyaline, lobes glabrous, rounded, 0.3 in long, obscurely 3-nerved. *Corolla* urceolate, much depressed, tube when at full length 0.75 in long, glabrous within and furnished in the middle with a 5-lobed undulate fold or corolline corona, the throat closed, with stiff inflexed decumbent shining white hairs, lobes triangular, 0.5 in long, thickened, villous within. *Staminal-corona* none. *Staminal-column* short, pyramidal, anther wings spreading outwards, horny, appendages very thin obtuse, connivent. pollen masses cylindro-clavate attached by cornucopia shaped caudicles as long as themselves to the ellipsoid pollen carriers. *Style-apex* conical, tip capitate. *Fruit* not known.

MALACCA *Mangay* (K D) 1115

3 *DISCHIDIA COLYRIS*, Wall Cat 4207 (1829). A creeping epiphyte, trailing over and rooting on the stems and branches of trees. stems slender terete rootlets very numerous and spreading. *Leaves* fleshy, coriaceous when dry, sessile orbicular, convex above with reflexed margins, mucronate or not at apex, slightly cordate at base in young leaves. wrinkled above, papillose and often lanose beneath. 1 to 1.5 in diam, midrib and nerves distinct on the lower surface. midrib stout. main nerves 2 to 3 pairs, nearly at right angles to the midrib, soon branching and spreading. reticulations very few visible. *Umbels* on stout tuberculate rachises in pairs at the ends of short stout clavate peduncles. pedicels very short, slender. flowers white, tipped with pale lilac. *Calyx* membranous, hyaline lobes ovate, ciliate, 0.25 in long. *Corolla* urceolate, tube globose, about 0.5 in long, glabrous on both surfaces, the mouth much contracted, forming a ridge within, lobes triangular, thickened, glabrous, erect. *Corona*-processes 5, very thinly membranous and hyaline, linear, with a spreading emarginate top with incurved broad flattened lobes. *Staminal-column* short, conical, appendages erect, acute, pollen masses oblong, obtuse, seated on cornucopia-shaped flattened caudicles as long as themselves and joined by them to the oblong hard brown pollen-carriers. *Style-apex* pyramidal, tip somewhat capitate. *Follicles* (1 or 2) linear-lanceolate, curved, tip recurved, 2 to 2.5 in long, .25 in broad, base slightly gibbous, pericarp thin, pale brown. *Seeds* cylindrical, 1.5 in long by .025 in broad, base winged and slightly bifid, testa very thin, brown, albumen rather copious, cotyledons ovate, fleshy, .05 in long, radicle cylindric, thick, .075 in long. Hook f Fl Br Ind IV 51. *D. albiflora*, Griff Notul IV 47, and Ic Pl As t 410A, fig 8, Beccari Malesia II 263. *Colyris*



*major*, Vahl in Trans Nat Hist Soc Copenh VI. 110 Wight Contrib 66 (*in part*)

MALACCA *Mangay* (K D) 1114 (perhaps also, but doubtfully, K D 1116, with rather large flatter leaves and frequent pustules), *Griffith* 3779 SINGAPORE *Walker*.—DISTRIB Burma (*Wallich* 4207), Java

We do not feel (any more than, apparently, did the author of the Fl Br Ind) quite sure of the identification of Griffith's specimens with those herein described (*Mangay* 1114), but believe that they correctly belong to this plant, representing terminal small leaved sprays *Conchophyllum imbricatum*, Bl Bydr 1061, cannot be this species, as it is described as having no staminal corona processes

4 DISCHIDIA COCCINEA, Griff Notul IV 45 (1854) and Ic Pl Asiat CCCCIX A small creeping epiphyte, trailing over and rooting on the stems and branches of trees, stems slender smooth or pilulose or with rounded warts rootlets very numerous and spreading Leaves fleshy coriaceous when dry, sessile orbicular, convex above, the margins broadly recurved, wrinkled above and with prominent large bullate protuberances pitted below by the protuberances and minutely pilulose, white when young, red when old, 5 to 1 in in diam mid rib and 1 to 2 pairs of branching nerves prominent beneath Umbels about 5 to 6 flowered, on short enlarged rachises at the ends of thick peduncles about 1 in long, the peduncles in pairs in the axils of the leaf-pairs pedicels slender, clavate, 15 to 2 in long, buds broadly conical, flowers scarlet with lilac tips Calyx membranous, hyaline, lobes very small, obtuse, glabrous Corolla uncelolate tube gradually attenuate upwards from an inflated base, 1 in long, slightly puberulous without, glabrous within, with an undulately 5 lobed ridge at a little above half height, lobes triangular ovate, thickened 0.3 in long, glabrous Corona-processes 5, membranous, linear, with an emarginate top bearing broad incurved lobes Staminal-column slender the anther-wings minutely horned, appendages ovate acute, connivent over the style apex, pollen masses oblong, slender, attached by minute cup-shaped caudicles to the ovoid dark brown pollen-carriers Style-apex 5 angled, conical with a subulate capitate tip Follicles (usually 2) about 1 in long, curved and much recurved, rather broad, pericarp crustaceous, smooth Seeds obovoid, 0.5 in long, the base minutely winged, the wing dentate, testa thin, pale brown, albumen scanty, cotyledons very small, 3 to 4 times smaller than the ovoid fleshy radicle Hook f Fl Br Ind IV 51

MALACCA *Mangay* (K D) 1119, *Griffith* 3780 PERAK at 4000 to 1500 feet near Larut, *King's Collector* 3840, 6905, at Gunong Ijuk, *Scortechini* 1185

The chief peculiarity of this species is in its pollen masses being elongate and having very small caudicles, and being therefore quite different from those of any other species we have examined. The Perak specimens have no flowers, and can therefore only be referred here tentatively, but we believe them to be correctly identified.

5 DISCHIDIA RAFFLESIANA, Wall Pl As Bar II 35, t 142 (1831), and Cat 4208. A creeping epiphytic undershrub, milky, much branched, rooting on the trunks and branches of trees and often pendent from them, stems glabrous or slightly pubescent, terete, lower ones as thick as a goosequill. Leaves fleshy, coriaceous when dry, changing into pitchers, orbiculate or ovate-orbiculate, obtuse or mucronate sometimes acuminate at apex, rounded at base, slightly peltate both surfaces glabrous, margins recurved, .75 to 1 in in diam, nerves faintly visible beneath, midrib slender, main nerves about 3 to 4 pairs, the lowest pair from the base and making an intramarginal nerve which the others join. Petiole stout, flat, 15 to 25 in long, sometimes longer, pitchers (*ascidia*) 2 to 5 in long, fleshy, thick, oblong or ovate-oblong, slightly curved, obtuse, gibbous at base, the cavity filled with rootlets from the adjoining node. Umbels about 6 to 8 flowered, small, rounded, on a thickened tubercular rachis at the end of a long or short (usually 5 in long) stout peduncle in the axil of the leaves. Podicels slender, buds ovoid, flowers pale yellow. Calyx membranous, lobes lanceolate, acute, ciliate, hirsute without. Corolla fleshy, urceolate, tube ovoid, pubescent without, 15 in long, lobes short, obtuse, villous with somewhat retrose stiff white hairs within, erect, .05 in long. Corona of 5 processes, attached to the base of the staminal column, each process on a stout base, deeply bilobed, lobes spatulate, incurved. Staminal column short, conical, anther-cells parallel, appendages acuminate, erect, membranous, pollen-masses rather long, linear-oblong-spathulate, seated on cup shaped clavate brown caudicles, which attach them to the oblong hardened dark pollen-carriers. Follicle 1, 2 to 3 in long, curved, 3 in broad below the middle, tapering thence to both ends, pericarp thin, smooth. Seeds 1 in long, somewhat angled, oblong obovate, narrowly winged on the margin, broadly winged and often dentate at base, truncate at tip, bearing a silky coma 1 in or more long, albumen very scanty, cotyledons elliptic, obtuse, .025 in long. Radicle 5 in long, cylindric. Griff Notul IV 47, t 386, fig 6, and in Trans Linn Soc XX 387 and 391, tt 17, 18, Dene. in DC Prodr VIII 632, Miq Fl Ind Bat II 512, Wight Contrib 44, Hook f Fl Br Ind IV 50, k Schum in Engl & Prantl Naturl Pflanzenfam IV 2, 228, fig 87 (from Wallich), Beccari Malesia II 263. *D. viridescens*, Griff l c 49. *Collyris major*, Vahl in Trans Nat Hist Soc Copenh VI 110, Wight Contrib 66 (*in part*).

PERAK at Larút, *Kunstler*. MALACCA. on islands, growing on *Anacardium*, *Maingay* (K.D.) 1117 PAHANG near Pekan and Kwala Pahang, *Ridley* in Trans. Linn. Soc. Ser. 2, III. 320. SINGAPORE: *Wallich* 4208, *Kurz*; *Deschamps*, *Kunstler* (*King's Collector*) 1209.—DISTRIB India (Cachar, Tenasserim), Borneo, Australia A coast plant, abundant in dry spots near the sea, disappearing inland (*Ridley*). The pitchers are usually occupied by ants

6 DISCHIDIA COMPLEX, Griff Notul IV. 50 (1854). A twining epiphyte, growing and rooting on the stems and branches of trees, stems very slender, terete *Leaves* replaced by pitchers (*ascidia*), the pitchers subreniform, compressed, about 2 in in diam, the orifice small, near the petiole, its margin inflexed, formed into a second pitcher much smaller than the outer one, opening on each side by an oblique opening deeply furrowed on the upper, carinate on the lower, side, the outer cavity filled with rootlets, the inner surfaces lurid purple. *Flowers* subumbellate, white, on thickened rachises at the ends of 1 to 3 in. long stout peduncles *Corolla* with sub-globose tube, scarcely narrowed at the mouth, lobes broadly ovate, fleshy, inflexed, the throat of the corolla closed with a ring of hairs *Corona*-processes with long narrow arms dilated at the tips. *Staminal-column* truncate, pollen-masses subobovate, attached by much dilated long keeled caudicles to the pollen-carriers (from Griffith) Hook f. Fl. Br Ind IV. 51, Beccari Malesia II 265.

MALACCA (*Griffith*, on trees

7 DISCHIDIA BENGHALENSIS, Colebri in Trans. Linn Soc XII. 357, t 15 (1817) A fleshy epiphytic undershrub, rooting on the trunk and branches of trees, often matted and often hanging in flagelliform sprays, stems rather stout, as thick as a goosequill, glabrous, winged when dry. *Leaves* very fleshy, thick, subsessile, linear-oblong elliptic obovate or spatulate, obtuse and apiculate at apex, attenuate at base, 5 to 2 in long, 25 to 75 in. broad, midrib and nerves scarcely ever visible, in dried specimens sometimes 3 to 5 pairs of main nerves at an acute angle with the midrib. petiole twisted, 1 to 15 in long. *Umbels* axillary, very short-peduncled, about 10-flowered, usually on stout enlarged rachises, pedicels .05 to .1 in. long, slender, buds ovoid, flowers pale yellowish-white. *Calyx* fleshy, lobes ovate, .03 in long. *Corolla* urceolate, glabrous on both sides, tube globose, .05 to .1 in in diam., lobes triangular, acute, .03 in long, thickened within *Corona* of 5 slender processes, membranous, stalk linear, branching in 2 falcate recurved subulate lacinae. *Staminal-column* short; anther-wings spreading, appendages short, connivent, pollen-masses falcate, truncate above, joined by a curved cup-shaped caudicle half as long as

themselves to the narrow ellipsoid pollen-carriers *Style apex* pyramidal *Follicles* usually 1 only, very slender, straight, acuminate, 1.5 to 2.5 in long, 1.5 in broad; pericarp thin, smooth *Seeds* almost cylindric, only slightly compressed at the sides, rounded and minutely denticulate below, 1 in long, truncate at tip and bearing a copious white silky coma, testa thin, pale brown, albumen very scanty, cotyledons fleshy, ovate, 0.5 in long from a broad base, radicle stout, nearly as large Spreng Syst Veg I 844, Wight Contrib 43, Dene in DC Prodr VIII 631, Bot Mag t 2916, Hook f Fl Br Ind IV 50 *D. cuneifolia*, Wall Cat 4206, Dene l c 633 *D. spatulata*, Blume Bijdr 1060, Miq Fl Ind Bat II 512

PERAK *Scortechini* 1188 *Kings Collector* 5751 SINGAPORE *Murray* (K D) 1121 —DISTRIB India (E Nepal, Sikkim, Assam and southwards), Java, Borneo

8 DISCHIDIA NUMMULARIA, Bl Prodr Fl Nov Holl I 461 (1810)  
A very slender epiphytic herb, rooting on the trunks and branches of trees, stems lanuginose, sometimes papillose or minutely puberulous, grey *Leaves* fleshy, coriaceous when dry, lanuginose, orbicular, acute obtuse or apiculate at apex, rounded at base or sometimes slightly cuneate, under surface more or less papillose margins often recurved, 2.5 to 7.5 in in diam midrib and 2 to 3 pairs main nerves much branching reticulating, scarcely visible even when dry petiole 0 to 0.5 in long *Umbels* few flowered lateral on short rachises and short thick peduncles or nearly sessile, pedicels 0.6 in long buds ovoid, flowers white *Calyx* lobes minute, acute, membranous *Corolla* unceolate, tube 0.75 in long, globose, throat villous within, with often retrorse hairs, lobes linear subulate, 0.25 in long, erect, thickened *Corona* of 5 processes attached to the base of the staminal column, each process linear below, bifid above in 2 recurved spatulate lobes *Staminal-column* short, conical, anther-wings conspicuous, anther-cells parallel, appendages membranous, acute, pollen masses oblong ellipsoid, attached by broad curved caudicles as long as themselves to the small brown horny pollen-carriers *Style-apex* 5-lobed, tip conical *Follicles* slender, curved, linear lanceolate, long-acuminate, broad near the base (6 in when open), pericarp chartaceous, brown, smooth *Seeds* flask-shaped, 0.5 in long, truncate at the tip and bearing a 1 in long white silky coma, testa thin Wall Cat 4204, Wight Contrib 43, Dene in Nouv Ann Mus Par III 378, and DC Prodr VIII 632, Bl Bijdr 1059, Miq Fl Ind Bat II 507, Benth Fl Austral IV 345, Hook f Fl Br Ind IV 49, Beccari Malesia II 2671, t lxii 7 to 11, Prain Beng Plants 699 *D. orbicularis*, Dene l c, Miq l c *Collyris minor*, Vahl in Act Soc Hafn VI 111, Wight Contrib 67 *D. Gaudichaudii*,

Dene l c , Miq l c 508 "*Nummularia lactea minor prima*," Rumph  
Herb Amb V 472, t 176, fig 1

PENANG *Curtis*, *Wallich* 4204A PERAK *Scortechini* 1109  
MALACCA *Griffith* 3778, *Mamgay* (K D) 1118 PAHANG in heath  
country *Ridley* (see Trans Linn Soc, Ser 2, III 321) SINGAPORE  
*Hullett* 136, 822, *King's Collector* 1270 —DISTRIB India (Cachar,  
Chittagong, Tenasserim and Andaman Islands), Malay Archipelago,  
Australia "A most noxious epiphyte in Singapore, draping and  
eventually killing trees' (*Ridley*, l c)

*Scortechini* 1135 is probably this species, but the leaves are slightly ovate. The  
specimen has no flowers. We cannot separate *D. Gaudichaudii* even by the retrorse  
hairs in the throat of the corolla for the character is most difficult to be sure  
about in such minute flowers and otherwise there seems to be no point of difference

9 DISCHIDIA ALBIDA, Griff Notul IV 46 (1854) A slender twining  
epiphytic herb or undershrub, rooting on the trunks and branches of  
trees, stems very slender, scabrid puberulous or glabrous. *Leaves*  
fleshy, coriaceous when dry ovate acute and mucronate at apex,  
rounded or cordate and slightly peltate at base, glabrous and shining  
on both surfaces margins slightly recurved, 5 to 75 in long, 1 in  
broad nerves very faint when dry, midrib slender, main nerves 3 to  
4 pairs, the lowest pair opposite starting from the base and forming an  
intramarginal looped nerve up to the apex, the remaining 2 to 3 pairs  
nearly horizontal joining the intramarginal nerve at the sinuses of the  
loops reticulations few netted petiole stout, 1 to 15 in long, puberu-  
lous. *Umbels* few flowered, on minutely tubercular, more or less thick  
and elongated, rachises at the ends of 5 to 75 in long rather stout  
peduncles, pedicels none or very slender, up to 06 in long, buds  
ovoid, acute flowers white tipped with pink. *Calyx* membranous,  
lobes ovate acute, 04 in long scales minute. *Corolla* unicolate, tube  
ovate globose, 15 in long, white-villous at the throat lobes triangular,  
erect, very small, with thickened margins. *Corona* very small, mem-  
branous, of 5 processes attached to the base of the staminal column,  
linear bifid, the lobes broad, flat, recurved. *Staminal-column* rather  
long, obconic below, conic above base with a rounded protuberance,  
anther-wings prominent, anther-cells parallel, appendages acuminate,  
pollen-masses ellipsoid, granular, seated on cornucopia like flattened  
caudicles as long as themselves, which connect them with the ovoid-  
oblong rather large brown pollen-carriers. *Style apex* with conical tip  
*Follicles* 'very long-beaked, deeply channelled on the inner face'  
(Griffith) "Seeds with very long slender coma (Griffith) Hook I  
Fl 131 Ind IV 50

PERAK at Bujong Malacca, *Curtis*, Ulu Batang Padang and Gunong Batu Pateh, 3000 to 5000 ft, *Wray* 970, 1519 on Maxwell's Hill and at Taiping, *Scortechini* 86, 313, 1227 MALACCA at Toondook, *Griffith* 3781 JOHORE at Gunong Pulau, 1800 ft, *G King*

10 DISCHIDIA HIRUTA, Dene in DC Prodi VIII 632 (1844) A slender epiphytic trailing herb, rooting on the trunks and branches of trees stems minutely papillose and slightly hispid-pubescent, newly white when dry, scarcely ever over 0.5 in in diam. Leaves fleshy, coriaceous and very pale when dry, broadly ovate, acute and mucronate at apex, rounded at base and slightly peltate shining and lacunose above minutely papillose beneath margins recurved, often hispid ciliate, 5 to 1 in long, 5 to 7 in broad midrib and 2 to 3 pairs of main nerves prominent above when dry, the nerves horizontal, meeting a looped intravaginal nerve close to the edge petiole very short, papillose Cymes umbellate 2 to 3 flowered, on very short rachises at the ends of short 1.5 to 2 in long papillose axillary peduncles buds ovoid, flowers dull red the tubedark blood red, the lobes rose coloured Calyx spreading lobes membranous ovate 0.5 in long scales minute Corolla uncoloured tube 2 in long globose below contracted at the mouth furnished within with a row of tufts of hair half way up and two further rows at the throat, the lower alternate with, the upper opposite to the short ovate acute lobes, which are 0.5 to 1 in long and bear 5 adnate fleshy scales behind the tufts of hair Corona of 5 rather large very membranous processes from the back of the staminal column between the wings slender below broad and hind and recurved above the lobes broadly rounded Staminal column conical, the anther-wings prominent, rounded at base anther cells parallel appendages acuminate, membranous, erect, pollen masses oblong clavate, obtuse, seated on upcurved brown caudicles with cup like top, which are half as long as the pollen masses and connect them to the large conical dark brown pollen carriers Style-apex very soft, tip long-conical Follicles "3 in long, curved linear lanceolate, glabrous" (*Scortechini*) Miq Fl Ind Bat II 599 Hook f Fl Br Ind IV 50, Bot Mag t 7853 *D. fasciculata*, Dene l c, Miq l c *D. Brunoniana*, Griff Notul IV 44, and Ic Pl Asiat t 410A, fig 1 (somewhat incorrect) *Leptostemum hirsutum* and *fasciculatum*, Blume Bijdr 1058

PENANG at Bato Ferong, *Curtis* 1897 PERAK at Waterfall Hill, *Wray* 137, *Scortechini* 180, at Laitut, 200 to 300 ft, *King's Collector* 6691 DINDINGS at Pangkore Island, *Scortechini* 1077 MALACCA *Griffith*, *Mangay* (K D) 1120 SINGAPORE *Ridley* 2730 - DISTRIB Burma (in Tenasserim (*Helper*), at Mergui in mangrove forests (*Griffith* 3782)), Java, Borneo

11 *DISCHIDIA ACUTIFOLIA*, Maingay MS, Hook f Fl Br Ind IV 51 (1883) A slender twining epiphytic undershrub, rather distantly rooting on the stems and branches of trees, stems terete, glabrous, striate when dry. *Leaves* coriaceous, pergamaceous when dry, lanceolate or ovate-lanceolate shining and glabrous on both surfaces, margins recurved, 2.5 to 4 in long, .75 to 1.25 in broad, midrib slender, impressed above when dry. main nerves 6 to 8 pairs, the lowest pair close to the lower margin, all at from 40° to 60° with the midrib, straight or curving to join an intramarginal looped nerve, reticulations netted, petiole stout, .25 in long. *Umbels* few-flowered, in pairs on thickened rachises at the ends of .5 to 1.5 in long peduncles, pedicels very short, buds conical flowers pale yellow with pink tips. *Calyx* very thin membranous, hyaline lobes ovate acute, .025 in long. *Corolla* uiceolite tube globose, .05 in long, throat with a row of usually erect stiff hairs lobes as long villous within, triangular, acute, thickened. *Corona* of 5 exceedingly thin membranous hyaline processes, stem subulate from a broad base top obtuse, rounded, with 2 rather short spatulate recurved arms. *Staminal column* somewhat elongate, filament portion membranous, anther wings rounded appendages crenate with erect acuminate tips pollen masses oblong truncate, on cornucopia shaped curved caudicles as long as themselves, and connected by them to the very slender lanceolate brown pollen carriers. *Style* apex pyramidal. *Fruit* not known.

PERAK *Scortechini* MALACCA *Maingay* (K D) 1122

We were only able to dissect one flower and that with some difficulty. In his MS notes (Vol IV pp 48-67) Maingay says: "Leaves of staminal corona minute so closely adpressed to the anthers that I question if in dried specimens of so minute a plant (flower?) they could be discoverable at all obtuse with short brachia. The corona processes are in fact, excessively thin, but they can be separated with care."

12 *DISCHIDIA CORDIFOLIA*, King & Gamble, n. sp. A creeping epiphytic undershrub, rooting on the trunks and branches of trees, stems about as thick as a crowquill terete internodes long. *Leaves* fleshy, thinly coriaceous when dry ovate, bluntly acute at apex, rounded or slightly cordate at base both surfaces glabrous, margins slightly recurved 1.5 to 2.5 in long, .1 to 1.75 in broad .5 to .7-nerved at the base midrib slender marginal pair of nerves very short and faint, second pair curving up to about half the length of the leaf, third pair at an angle of about 30° with the midrib, curving near the margins to form an intramarginal nerve rejoining the midrib a little below the tip, other main nerves none secondary nerves about 2 pairs, reticulations irregularly netted, petiole .5 in long, broad, flattened. *Umbels* few-flowered, in pairs on tubercular rachises about .15 in long at the ends of stout

peduncles 5 in long pedicels very short, slender, buds ovoid *Calyx* membranous, lobes ovate-acute, 0.5 in long, scales small *Corolla* campanulate, tube 1 in long, glabrous on both sides, lobes 0.75 in long, thickened, glabrous *Corona* of 5 very thin hyaline processes, about 0.4 in long from the back of the anthers between the wings, linear-stalked with orbicular rounded tops and sagittate lobes *Staminal-column* attached to the base of the corolla-tube filament part short, anther cells parallel, appendages short, acute, pollen-masses ellipsoid, on caudicles nearly as long as themselves, which attach them to the narrowly oblong pollen-carriers, the caudicles curved upwards to a cup-like oblique mouth, and broadly membranously winged on the inside *Style apex* short, blunt *Fruit* not known

PERAK at Maxwell's Hill, 3000 ft, *Scortechini* 424, 516

13 DISCHIDIA MONTICOLA, King & Gamble, n. sp. A trailing epiphytic undershrub, rooting at intervals on the trunks and branches of trees stems slender, terete, internodes long *Leaves* fleshy, thinly coriaceous when dry, ovate or ovate-lanceolate, acuminate at apex, rounded or attenuate at base both surfaces glabrous, margins slightly recurved 1.5 to 3.5 in long, .75 to 1 in broad 5 nerved, the midrib slender outer pair of basal nerves short, reaching about the middle of the leaf, second pair at an angle of about 20° with the midrib, forming a looped intra-marginal nerve till close to the midrib, main nerves 2 to 3 pairs, short, inconspicuous, joining the midrib to the sinuses of the looped nerve, reticulations netted, irregular petiole .25 in long somewhat twisted *Umbels* few-flowered (?), in pairs on tubercular rachises 2 to 3 in long at the end of a .75 to 1.75 in long straight lateral peduncle pedicels very short, slender, buds ovoid, flowers pale green (Wray) *Calyx* membranous lobes ovate-acute, puberulous without, .05 in long scales rather large *Corolla* campanulate, 1.25 in long, tube glabrous, lobes also glabrous, thickened, scarcely over .025 in long *Corona* of 5 very thin membranous processes, each linear stalked with a rounded bluntly sagittate head *Staminal column* short, anther wings broad, anther cells parallel, appendages very long-acuminate, pollen-masses ellipsoid, on cornucopia-shaped caudicles as long as themselves, which connect them to the slender oblong pollen-carriers *Style-apex* with a short conical tip *Fruit* not known

PERAK at camp on Ulu Batang Padong, 4900 feet, Wray 1503, on Canfield's Hill, 4000 feet, *Scortechini* 423, &c.

Scortechini has marked his specimens '*D. sagittata*, Dene,' but they do not agree at all well with the descriptions in DC Prodr VIII 631. There are no specimens of *D. sagittata* in the Kew Herbarium, but the descriptions give the leaves as obtuse at apex and attenuate into the petiole at base, which hardly suits



*D. monticola*. In the glabrous flowers *D. monticola* and *D. cordifolia* come very near to each other.

14 DISCHIDIA SCORTECHINII, King & Gamble, n sp A slender glabrous creeping epiphytic undershrub, sparingly rooting on and often pendulous from the trunks and branches of trees, stems terete, internodes long, 2 to 4 in or more Leaves fleshy, pergamaceous when dry, ovate-lanceolate, attenuately acuminate at apex, rounded at base, glabrous on both surfaces, 2 to 2.5 in long, about .5 in broad 3- to 5-nerved, midrib slender, raised beneath, sometimes with a gland at the base, lowest pair of nerves short and faint, next pair prominent forming an intramarginal looped nerve 1 to 1.5 in from the midrib nearly or quite to the tip, main nerves about 4 to 5 pairs, leaving the midrib at nearly right angles, and joining the intramarginal nerve at the loop-sinuses reticulations netted petiole 1.5 to 2 in long, rugose Umbels few (5 to 6) flowered on short rounded tubercular thick rachises at the ends of stout axillary 3 in long peduncles pedicels reddish, slender, .05 in long buds lanceolate ovoid, 1.5 to 2 in long flowers white tipped with scarlet Calyx membranous lobes ovate acute, .05 in long slightly puberulous without scales very minute Corolla unicolate tube ovoid, glabrous without, pubescent above within, 1.25 in long throat gradually contracted lobes erect, 1 in long, thickly villous within, especially in their lower half Corona of 5 exceedingly thin membranous processes, attached to the backs of the anther part of the column, each process on a narrow base, soon spreading into a rounded obtusely sagittate tip Staminal column rather long filament portion free anther wings broad shining, horny anther-cells parallel, with acuminate, erect, connivent, membranous appendages pollen masses oblong ellipsoid, attached by slender caudicles as long as themselves to the very narrow slender pollen carriers the caudicle cornucopia shaped, with a narrow membranous wing on the inside edge Style apex long conical, membranous Pollen not known

PERAK Scortechinii 543

We at first thought that this was *D. lanceolata* Dene (*Leptostemma lanceolatum*, Bl Hydr 1857), but in that species the bases of the leaves are markedly attenuate into the broad flat petiole, and the venation is more strongly 3 to 5 nerved

15 DISCHIDIA TUBULIFLORA, King & Gamble n sp A slender creeping epiphytic undershrub, rooting on the trunk and branches of trees, stems wiry, puberulous Leaves fleshy coriaceous when dry, ovate or ovate-lanceolate, acute or acuminate at apex, rounded at base glabrous on both surfaces, shining above and wrinkled when dry margins recurved, .75 to 1.25 in long, 3 to 6 in broad, nerves only

clear on under-surface when dry; midrib slender, with usually a gland at the base above; main nerves 3 to 5 pairs, acutely curved to join in a looped intramarginal nerve; petiole .1 to .25 in. long, pubescent. *Umbels* few-flowered, on a cylindrical tubercular rachis about .25 in. long at the end of a thick .15 in. long peduncle, buds slender, cylindric-clavate, reaching 4 to .5 in. long. *Calyx* membranous; lobes ovate-acute, .05 in. long, pubescent without. *Corolla* tubular, urceolately inflated below, then contracted in a neck having a small swelling in the middle; glabrous without, glabrous within, except a densely villous ring at the swelling, tube 3 to .4 in. long; lobes linear, erect, .1 to .15 in. long, villous within. *Corona* of 5 exceedingly thin hyaline processes, which are inserted between the anther-wings, have narrow stalks, and are broadly rounded above and sagittate below. *Staminal-column* elongated, filament part cylindric, .075 in. long, anther-wings horny, tailed at base, anther-cells parallel, with long-acuminate erect connivent appendages, pollen-masses oblong-ellipsoid, on slender caudicles as long as themselves, and connecting them with the ovoid-acute pollen-carriers, the caudicles cornucopia-shaped, and having a hyaline inner margin. *Style-apex* long, subulato-acuminate. *Follicle* 1, slender, curved, 2 in. long, 1 in. broad, acuminate at tip, pericarp thin, strate, glabrous. *Seeds* minute, linear, .1 in. long, tipped with a white silky coma, testa thin, pale.

PERAK *Scortechini* 256, 465, *King's Collector* 2100

The description is from *Scortechini* 465, the only specimen with flowers and fruit, and the only one, consequently, quite certain

#### SPECIES OF WHICH LEAVES ONLY KNOWN

16 *DISCHIDIA* *DESCHAMPSII*, King & Gamble, n. sp. A twining apparently epiphytic undershrub, rooting on the stems and branches of trees, branches slender, terete. *Leaves* coriaceous, elliptic or elliptic-ovate, bluntly acute at apex, somewhat rounded at base, glabrous on both surfaces and somewhat shining, margins recurved, 1.5 to 3 in. long, .75 to 1 in. broad, midrib slender, raised beneath when dry, main nerves about 5 pairs, the lowest pair from the base forming a looped intramarginal nerve, which is joined at its sinuses by the others, which are at an angle of about 70° with the midrib, reticulations irregular, prominent, all raised on both surfaces when dry, petiole thick, .15 to .25 in. long. *Umbels* on thickened rachises often 5 to 7.5 in. long, at the ends of stout peduncles about 1 in. long. *Flowers* and *Fruit* unknown.

SINGAPORE roadsides, *Deschamps*

## 29 PYCNORHACHIS, Benth

A hairy twining undershrub *Leaves* opposite *Flowers* in reflexed pairs, spirally disposed round the long fleshy branches of an axillary racemiform cyme *Calyx* 5 partite, scales 5 to 10 *Corolla* turbinate, with short tube, deeply 5 fid, lobes valvate, slightly twisted to the left *Corona* scales 5, spreading at the base of the staminal-column opposite the anthers *Staminal-column* short, adnate to the middle of the corolla tube, anthers erect, with membranous, hyaline appendages pollen masses 1 in each cell, long, slender, cylindric, waxy, erect, attached by short caudicles to the pollen carriers *Ovary* of 2 carpels, sunk in the calyx tube style apex 5 angled, obtusely conical, much shorter than the anthers *Fruit* of curved, smooth, cylindric, obtuse follicles *Seeds* comose — **DISTRIB** One species only

**PYCNORHACHIS MAINGAYI**, Hook f in Fl Br Ind IV 63 (1883) Branches flexuose, hispid with spreading tawny hairs *Leaves* oblong obovate, abruptly cuspidate acuminate at apex, narrowly cordate at base, both surfaces hispidly hairy with bulbous based hairs, especially on the nerves 4 to 6 in long, 1 5 to 2 in broad midrib prominent beneath main nerves 10 to 12 pairs, curving upwards and joined by prominent transverse reticulations petiole 2 5 to 5 in long, villous *Cymes* 3 to 6 in long peduncle 1 to 2 in long, thick branches usually 1 to 3, 3 in in diam minutely pubescent flower-pairs on rounded tubercles, pedicels short buds conical, long-acuminate *Calyx* minutely red-hairy without glabrous within, lobes linear-lanceolate, 1 in long *Corolla* deep purple tube very short, thickened, with a fringed annulus lobes about 2 5 in long, subulate linear-lanceolate from a broad base *Corona* of 5 thickened fleshy obtuse processes on the backs of the anthers *Staminal column* short appendages long, subulate hyaline pollen masses clavate slender, attached by minute caudicles to the bases of the linear clavate pollen carriers *Style apex* deeply 5 lobed the lobes running up to a rounded apiculus *Follicles* 5 in long 7 in broad, cylindric, curved in sickle shape, pericarp glabrous *Seeds* comose

**MALACCA** *Maingay* (K D) 1141

The description like that of Fl Br Ind, is chiefly taken from the full notes given in Maingay MS Vol IV 64

**Tribe V CYPHOPIGÆ**

**Stamens** with their filaments connate into a tube, and adnate to the style-apex at the top **Anthers** erect or incumbent over the style-apex, with or without appendages **Pollen-content** of each anther cell united in a waxy mass, pollen-masses pellucid on the margin or at

the apex, attached in pairs to the carriers by short caudicles, erect or horizontal in the cells, never pendulous

- Corona double outer corolline, of small processes in the sinuses  
of the corolla lobes, inner staminal, annular flowers small,  
corolla rotate .. .. . 30 LEPTADENIA
- Corona double, both staminal outer cup shaped, inner usually  
erect, subulate, flowers rather large, corolla tubular 31 CIROPEGIA

### 30 LEPTADENIA, R Br

Shrubs, twining or erect, and then with stiff much-branched rush like stems *Leaves* opposite, variable, sometimes absent *Flowers* small, in umbellate, lateral, sessile or pedunculate, many-flowered cymes *Calyx* 5 lobed to the middle or further, scales absent *Corolla* deeply 5 lobed, rotate or with a short campanulate tube and spreading lobes valvate in bud *Corona* double, outer corolline, of 5 short transverse or rounded fleshy processes alternating with the lobes of the corolla at the sinuses, inner staminal, of a raised undulate fleshy ring at the base of the staminal-column *Staminal-column* arising from the tube of the corolla, to which the filaments are sometimes adnate anthers incurved on the style-apex, with minute or no appendages, pollen masses 1 to each anther-cell, suberect or erect, ovoid, with a pellucid apex, attached in pairs by fleshy caudicles to the pollen carriers *Ovary* of 2 distinct carpels style-apex conical, with a 5-angled base, tip often bifid *Fruit* of usually 1 thick smooth follicle *Seeds* small ovate oblong, comose —*DISTRIB* Five or six species, three being twiners and two erect shrubs Four species are found in Central Africa, one extending through Egypt and Arabia into Western India, one in Madagascar, and one in India and Malaya

LEPTADENIA RETICULATA, W & A in Wight Contrib 47 (1834) A hoary twining shrub, stems with corky deeply cracked bark, branchlets terete, glabrous or hoary-puberulous *Leaves* thinly coriaceous, subdeltoid or ovate or ovate-oblong or ovate lanceolate, acute at apex, rounded or cuneate at base, both surfaces pale, glabrous or more or less finely pubescent, 1.5 to 3 in long, .75 to 1.75 in broad, midrib rather broad, without basal glands, but sometimes with a minute tuft of hair at the base, main nerves 5 to 7 pairs, spreading, faint, reticulations netted, obscure, petiole .25 to .75 in long *Cymes* many-flowered, hoary-puberulous, shorter than the leaves, often in pairs on the peduncles, peduncles .25 to .75 in long, bracts minute, clustered at the thickened bases of the umbels, pedicels slender, up to .5 in long, buds globose, flowers greenish-yellow *Calyx* rotate-campanulate, divided to about the middle, pubescent without lobes ovate oblong,

05 in long *Corolla* rotate, with a short tube, lobes thick, ovate-lanceolate, 1 in long, pubescent, and with a small hairy protuberance on the inner face near the tip *Corona* corolline of 5 fleshy truncate or acute processes at the sinuses, villous on the back and tips, staminal of a sometimes obscure, annular, undulate, ring below the anthers *Staminal-column* adherent below to the corolla-tube, filaments united, thin, lower part of anthers thickened, upper part incumbent over the style-apex, appendages minute pollen-masses ovoid, reticulate, with a pellucid apex, attached by moderately long, often elastic, clavate, pellucid caudicles to the small oblong pollen-carriers *Style-apex* 5-rayed, conical, sometimes bifid *Follules* subwoody, 2.5 to 3.5 in long, .75 in broad, lanceolate, with a blunt shortly curved beak, keeled on the ventral surface, pericarp smooth, pale grey when dry, thick *Seeds* narrowly ovate oblong, acute, infolded, broadly winged, .25 in long, ending in a 1 to 1.5 in long white silky coma, testa thick cotyledons fleshy embryo small *Wight* Ic t 350, *Wall Cat* 8197, *Dene* in DC *Prodr* VIII 628, *Miq Fl Ind Bat* II 503, *Dalr & Gibs Bomb Fl* 152, *Hook f Fl Br Ind* IV 63 *Trimen Fl Ceyl* III 164 *Cooke Fl Bomb* II 172 *L. appendiculata*, *Dene l c* *Miq l c* *L. imberbis*, *Wight Contrib* 48, *Wall Cat* 8198, *Dene l c* *L. brevipes*, *Wight Cat* 1536 *Cynanchum reticulatum*, *Retz Obs* II 15 *C. asthmaticum*, *Herb Hain* 766 *Secamone canescens*, *Smith in Rees Cycl* *Isclapras suberosa*, *Roxb Fl Ind* II 38 *Gynmena aurantiaca* *Wall MSS*

SINGAPORE *Lobb* 333 —DISTRIBUTION Northern Western and Southern India, Burma, Ceylon

*Lobb* a specimen has ovate lanceolate leaves acute corolline corona processes and almost no trace of the ring forming the staminal corona, but otherwise appears to be the same as the Indian plant

### 31 CROPGIA, LINN

Perennial herbs, erect or twining *Rootstock* a tuber or a fascicle of thick fleshy roots *Leaves* opposite, sometimes minute or 0 *Flowers* usually moderate sized or large, of various often singular forms, solitary, in pairs or in umbellate or racemose cymes, lateral, rarely terminal *Calyx* 5 partite, with 5 glandular scales within *Corolla* tubular usually more or less inflated at the base, straight or curved, 5 lobed the lobes free or more or less connate at their tips, valvate in bud *Corona* double, arising from the staminal column outer cup shaped, entire or 5- to 10 toothed, or of 5 bifid lobes more or less adnate to the inner corona-lobes and often appearing to form one

series with them, or reduced to minute pouches alternating with the stamens, inner of 5 short or long processes opposite the anthers and incumbent on them or erect, dorsally adnate at their base to the cup of the outer corona or laterally to its lobes, when the corona appears to be formed of 5 lobes with a tooth on each side at their base. *Staminal column* arising a little above the base of the corolla, short and, with the corona, included in its inflated basal part, anthers erect ascending or incumbent on the top of the style-apex, without appendages. *Pollen-masses* erect, ascending or subhorizontal, 1 in each anther cell, subsessile on, or attached in pairs by short caudicles to, the pollen carriers. *Ovary* of 2 carpels. *Style apex* truncate or shortly conical, not exserted. *Fruit* of 1 or 2 lanceolate or linear fusiform, acuminate, smooth follicles. *Seeds* comose. —**DISTRIB.** A large genus of 80 or more species, found in Africa, India, Malaya and Tropical Australia.

**CROPLEGIA LUCIDA**, Wall Pl As Rar II 33 t 139 (1831), and Cat 8133. A twining shrub, with irregularly fascicled fibrous roots. branchlets glabrous smooth, more or less angular when dry. *Leaves* fleshy when green, membranous when dry. ovate- or oblong lanceolate, acuminate at apex, acute or somewhat obtuse at base, glabrous on both surfaces. 4 to 7 in long, 1 5 to 3 in broad, midrib slender, main nerves 6 to 7 pairs, obscure, acutely curving upwards, reticulations irregular, scarcely visible. *Petiole* 5 to 1 5 in long. *Cymes* up to 3 in long, 1 to 3 together at the nodes, peduncles reddish, stout, 1 to 2 in long, bearing umbellate racemes with a 25 to 5 in long thickened rachis and with white rounded glands and linear subulate bracts. *Pedicels* slender, 5 in long. *Flowers* green, spotted with purple in the tube and with purple brown tips to the lobes. *Calyx* very deeply cleft. lobes linear subulate, slender, recurved, 4 to 5 in long, glandular scales rather large, ovate, flat. *Corolla* 1 5 to 2 in long, curved, glabrous without, also within, except at the base of the tube, which is sparsely villous, tube scarcely inflated below, broadly funnel shaped below the lobes, lobes lanceolate, at first spreading, afterwards inflexed and connate at the dilated long-ciliate tips. *Corona*-processes outer 10 lobed, lobes short, triangular, long ciliate, inner linear spathulate, connivent at the tips. *Staminal column* short, pollen-masses nearly globose, subsessile on the clavate pollen-carriers. *Style apex* 5 angled, apiculus conical. *Fruit* not seen. **Wight Contrib 33**, **Dene in DC Prodr VIII 641**. **Hook f Fl Br Ind IV 73**.

**PENANG** at Penara Bukit, 1000 ft, *Curtis* 1007 —**DISTRIB.** India (Silhet and Cachar), Burma

## Family LXXVII. LOGANIACEÆ.

Trees, shrubs or herbs, sometimes climbers *Leaves* opposite, rarely ternate, simple, stipules various or absent. *Flowers* hermaphrodite or, by abortion, subdioecious, in terminal or axillary, simple or compound, cymes, the cymes sometimes subcapitate or reduced to solitary flowers *Calyx* small, inferior, its limb imbricately 4- or 5-toothed or -lobed. *Corolla* tubular, funnel-shaped or campanulate, limb with 4 or 5 lobes or teeth, imbricate, valvate or contorted *Stamens* 4 or 5, inserted on the corolla-tube, alternate with the lobes, anthers 2-celled, their dehiscence introrse, longitudinal, rarely 1-celled, divaricate, with confluent tips *Carpels* 2, connate into a free 2-celled ovary, ovules 1 or more in each cell, placentas on the septum or basal at the inner angle, style simple, stigma capitate, 2-fid or 2-partite *Fruit* a septicidal capsule or a berry, 1- to many-seeded *Seeds* various, albumen fleshy or cartilaginous, embryo straight—DISTRIB. About 450 species, tropical and sub-tropical

Ovary with many ovules in each cell (Tribe I. EULOGANIÆ) —

Herbs; corolla valvate, capsule didymous —

Cymes 2- or 3-chotomous; flowers 5-merous . . .	1. MITREOLA
Flowers solitary or clustered, 4-merous . . .	2 MITRANACME

Shrubs (often scandent) or trees —

Fruit dehiscent, capsular, 2-celled

Corolla-lobes imbricate . . .	3. BUDDLEIA
Corolla-lobes valvate . . .	4 NORRISTIA

Fruit indehiscent —

Corolla lobes contorted in aestivation . . .	5 FAGREA
Corolla-lobes valvate in aestivation . . .	6 STRICHNOB

Ovary with a single ovule in each cell (Tribe II. GAERTNERIÆ) 7 GAERTNERA

## 1 MITREOLA, Linn

Herbs with opposite membranous leaves and small or membranous stipules *Cymes* 2- to 3-chotomous, terminal, or peduncled and axillary *Flowers* small, white, often secund on the ultimate branches of the cymes. *Sepals* lanceolate. *Corolla* urn-shaped, with 5 small valvate lobes. *Stamens* 5, included *Ovary* 2-celled, styles 2, short, at first connate and crowned by the small hairy stigma, ultimately divergent, ovules many in each cell, attached to peltate placentas. *Capsule* obovoid, laterally compressed, truncate or 2-horned, carpels dehiscent by separating from above downwards from each side of the septum. *Seeds* numerous, minute, globose or elongate, albumen fleshy, embryo linear —DISTRIB Species 4, 2 of them American, 2 Asiatic.

1 MITREOLA OLDENIANDROIDES, Wall Cat 4350 (1829). Annual,

erect, 6 to 18 in high *Leaves* linear-lanceolate, narrowed at both ends, nearly glabrous, about 2 in long and 75 in broad, petiole 25 in long *Cymes* 2 to 6 in long, often numerous, terminal and axillary, dichotomous, bracts lanceolate, less than 1 in long *Flowers* subsessile, under 1 in long, capsules 2-horned, secund *Seeds* twice as long as broad, trigonous A DC Prodr IX 9, Hook. Ic Plant 827, Miq Fl Ind Bat II 360, Benth in Journ Linn Soc I 91, Clarke in Hook f Fl Br Ind IV 79 *M paniculata*, Wall Cat 4349, Wight Ic 600 (*inaccurate*) A DC l c *M inconspicua*, Zoll et Mor Vers (1845 to 1846) 55

Said to occur in Kedah, but no specimen seen —DISTRIB Andaman Islands, Burma, Central Provinces of British India, Malay Archipelago, Australia

## 2 MITRASACMI, Labill

Small herbs, with opposite leaves and stipules forming a minute sheath *Flowers* small, white, terminal or axillary, solitary, clustered or in irregular umbels *Calyx* campanulate 4 fid *Corolla* urceolate, with 4 valvate or reduplicate sometimes spreading lobes *Stamens* 4, included filaments rather short, adnate to the tube anthers ovate with cordate bases, connective often produced beyond the apex of the parallel cells *Ovary* 2 celled styles 2, connate separating from the base upwards, finally divergent, stigma capitate or two lobed, ovules many in each cell, on peltate placentas *Capsule* subglobose, laterally subcompressed, truncate, or somewhat 2 horned, dehiscing by the separation from above downwards of the carpels from the septum on each side *Seeds* numerous, minute, subglobose testa smooth, reticulated, albumen fleshy, embryo straight —DISTRIB 28 species, in Eastern Asia, New Zealand, Australia

MITRASACMI POLYMORPHA, R Br Prod Nov Holl I 452 (1810) An erect annual herb, 3 to 9 in high, often with a long erect branch from the uppermost leaf axil *Stem* slender, glabrous except for a few slender hairs in the leafy part *Leaves* sessile, oblong, blunt, confined to the lower inch or two of the stem, glabrous, 2 to 3 in long, and about 05 in broad *Umbels* terminal, or at the ends of the scanty branches, few-flowered, very lax, pedicels much longer than the flowers, slender, unequal, glabrous *Flowers* 15 in long *Calyx* with 4 spreading, triangular, acute lobes *Corolla* twice as long as the calyx, throat hairy *Capsule* subglobose, glabrous, about 1 in across A DC Prodr IX 10, Benth Fl Austral IV 353, Solereder in Engl & Prantl Naturl Pflanzenfam IV 2, 35, Fig 18a c *M capillaris*, Wall in Roxb Fl Ind ed Carey & Wall I 420, and Cat 4348, Don Prodr



Fl Nep 129, A DC l c 11 Benth in Journ Linn Soc I 92, Miq  
Fl Ind Bat II 362 *M trinervis*, Spanoghe in Linnæa XV 335  
(1841) A DC l c 560 *M malaccensis*, Wight Ic 1601 *Linnophila*  
*campanuloides*, Benth in Wall Cat 3908

MALACCA *Goodenough* 669 — DISTRIB Northern and Central  
India, Burma, Malay Archipelago, China, Australia

### 3 BUDDLEIA, Linn

Trees, shrubs, or herbs *Leaves* opposite, entire or crenate, united  
by a stipular line *Cymes* in dense globose or corymbiform cymes,  
axillary or in a terminal thyrsoid panicle *Calyx* campanulate, 4 merous  
*Corolla* urn-shaped lobes 4, imbricate in bud *Stamens* 4, adnate to  
the corolla tube anthers subsessile, ovate or oblong, with cordate or  
2 lobed bases, cells parallel *Ovary* 2 celled, style linear, clavate  
ovules numerous in each cell, stigma terminal or decurrent on two  
sides *Fruit* a septicidally 2-valved capsule the valves entire or bifid  
*Seeds* many, oblong or fusiform testa usually lax, or expanded into a  
wing or tail albumen fleshy embryo straight DISTRIB About  
100 species, tropical and subtropical regions of the Old World

Under surfaces of leaves, young branches and inflorescence  
with minute yellowish pubescence

. 1 *B. asiatica*

Under surfaces of leaves, young branches, and inflorescence  
densely rusty tomentose

2 *B. madagascariensis*

1 BUDDLEIA ASIATICA, Lour Fl Cochinch 72 (1790) A shrub,  
3 to 6 ft high (sometimes as much as 15 ft), young branches thicker  
than a crowquill covered, like the branches of the inflorescence,  
with a subdeciduous minute yellowish pubescence *Leaves* opposite,  
membranous oblong lanceolate, the apex much acuminate, the base  
usually much narrowed edges entire or with minute distant teeth,  
upper surface dark when dry, glabrous except the puberulous depressed  
midrib, lower surface pale yellowish brown, minutely pubescent, main  
nerves 5 to 7 pairs, curving abruptly upwards and interarching rather  
far from the edge, thin but prominent like the midrib on the lower  
surface, obscure on the upper, length 2.5 to 6 in, breadth .6 to 1.5 in,  
petiole 1 to .35 in long *Inflorescence* terminal, consisting of numerous  
3-flowered sessile cymes, arranged in spikes to form a few branched  
lax panicle, 5 to 9 in long *Flowers* 1.5 in long, on very short  
pedicels *Calyx* half as long as the corolla, pubescent externally, lobes  
erect, acuminate *Corolla* glabrous, lobes blunt *Ovary* narrowly  
oblong tapering to the apex, stigma large, capitate, corrugated  
*Capsule* 2 in long Benth in DC Prodr X 446, Bot Mag t 6323,  
Brandis For Fl 318, Kurz For Fl II 250, Miq Fl Ind Bat

II 363, Clarke in Hook f Fl Br Ind IV 82 *B. Neemda*, Ham in Wall Cat 6401, Roxb Fl Ind ed Carey and Wall I 411 Reichenb Ic Bot Exot 21 *B. discolor*, Roth Nov Spec 83, Wight III 165b, and Ic 894 *B. salicina*, Lamk III I 291 *B. acuminatissima*, Blume Bijdr 743 *B. subseriata*, Don Prodr Fl Nep 92 *B. virgata*, Blanco Fl Filip 57 *B. serratula*, Roth l c 82

In all the Provinces common

2 *BUDDLIA MADAGASCARIENSIS*, Lamk Encyc I 513 (1783) A slender creeper, 60 to 80 ft long, young branches half as thick as a crow quill, covered, like the under surfaces of the leaves the inflorescence and the outer surface of the calyx, with dense pale brown tomentum. Leaves coriaceous, elliptic lanceolate, the apex shortly acuminate, the base cuneate, upper surface very dark when dry, glabrous, reticulate, main nerves about 8 pairs, spreading slightly prominent on the lower surface and depressed on the upper, length 2 to 3.5 in, breadth 6 to 1 in, petiole 3 to 5 in. Inflorescence a terminal, often leafy, thyrsoid panicle 8 to 12 in long, with numerous diverging branches from 1 to 2 in long (shorter near the apex), bearing pedunculate few flowered umbellate cymes. Bracteoles at base of branches linear, about 5 in long. Flowers orange, 4 in long, sessile, on very short pedicels. Calyx obovoid ellipsoid, teeth short blunt, tube glabrous within. Corolla silver shaped lobes of the limb blunt, short, reflexed, glabrescent, tube cylindric, 3.5 in long, cottony without, sparsely hairy inside like the narrowly oblong ovary. Anthers sessile near the mouth of the corolla tube. Capsule globular, 3.5 in in diam, pericarp thick, scaly, dark coloured. Lamk III I t 69, fig 3 Benth in DC Prodr X 447, Bot Mag 2824

PENANG Hullett 121, Murton 4, Ridley 7049, King's Collector 1340 PERAK King's Collector 5201, MALACCA Mainyay (K D) 1033/2 Wallich 6402 A native of Madagascar, but in some spots within our area almost naturalised

#### 4 *NORRISIA*, Gauch

A shrub, the young parts pubescent. Leaves opposite, petioles dilated at the base and subconnate. Flowers small, yellow. Calyx small, 5 lobed. Corolla with narrow cylindric tube, the limb with 5 small, ovate, valvate lobes. Stamens 5, inserted on the corolla-throat, filaments slender, anthers ovate. Ovary 2-celled, style filiform, stigma capitate, ovules numerous in each cell. Capsule oblong, septicidally 2-valved, carpophore finally free. Seeds numerous, testa lax, 4 to 6 times as long as the linear caudate nucleus, albumen fleshy, embryo straight or curved.—DISTRIB Two species, both Malayan

Flowers .25 in. long; capsules .15 in. long	..	..	1. <i>N. malaccensis</i>
Flowers .35 in. long; capsules .25 in. long	..	..	2. <i>N. major</i>

1 *NORRISIA MALACCENSIS*, Gardn. in Hook. Kew Journ. I. 327 (*in part*) (1849). A tree, young branches much thinner than a goosequill, terete, deciduously fulvous-puberulous and with many lenticels, dark brown when dry. *Leaves* thinly coriaceous; ovate or elliptic, acute at each end, upper surface brown, glabrous, shining; the lower rather pale olivaceous, glabrous except the deciduously puberulous midrib and nerves (uniformly puberulous in var.), main nerves 4 to 6 pairs, ascending, curved, prominent like the midrib on the lower surface, indistinct on the upper, length 1.5 to 2.5 in., breadth .85 to 1.25 in., petiole .25 in. *Cymes* as in *N. major*, but smaller, and the flowers only .25 in. long, and the ripe capsules rather less than .15 in. long. Clarke in Hook. f. Fl. Br. Ind. IV. 85 (*in part*)

MALACCA. Griffith (K.D.) 3731 (*in part*), Mamgay (K.D.) 1023, Goodenough 1382, Derry 1035.

VAR *pubescens*, King & Gamble. Under surfaces of leaves uniformly pubescent.

PERAK. *Scortechini* 634, King's Collector 10535.

2 *NORRISIA MAJOR*, Solereder in Engl. & Prantl. Naturl. Pflanzenfam. IV. 2, 37 (1892). A tree, young branches thinner than a goosequill, terete, deciduously fulvous-puberulous, black when dry. *Leaves* thinly coriaceous, elliptic or oblong-elliptic, acute, the base cuneate, both surfaces olivaceous-brown when dry, the lower reticulate, both glabrous except the fulvous-puberulous midrib and nerves on the inner surface, main nerves 5 to 7 pairs, stout, oblique, little-curved, deciduously fulvous-puberulous like the midrib on the lower surface, length 2.75 to 3.25 in., breadth 1.5 to .25 in., petiole .2 to .25 in. long. *Cymes* in dense, corymbose, terminal, pedunculate panicles, their branches fulvous-tomentose, bracts linear, about .2 in. long or less. *Flowers* sessile or subsessile, minutely bracteolate, .35 in. long. *Calyx* minute, cupular, 5-toothed. *Corolla* with a cylindric tube slightly dilated near the base, densely pubescent outside, the mouth with 5 linear-oblong, blunt, much recurved lobes, glabrous inside, filaments much exerted, anthers broadly ovate. *Capsule* .25 in. long and about .15 in. in diam., ellipsoid, pubescent. *Seeds* with a much elongate wing at each end. *N. malaccensis*, Gardn. in Hook. Kew Journ. Bot. I. 327; Clarke in Hook. f. Fl. Br. Ind. IV. 85 (*in part*) *Antonia Griffithii*, Wight Ill. II. t. 156b.

PERAK. King's Collector 7845, 10882. MALACCA: Griffith; Mamgay (K.D.) 1024, Ridley 1382. SINGAPORE. Ridley 6828.

5 FAGRAA Thunb

Trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, entire (crenulate in *F. crenulata*) petioles dilated at the base or united by a stipular sheath. *Cymes* terminal or axillary, corymbose racemose or paniculate, bracts small. *Flowers* large or small, white or yellowish, rarely pink. *Calyx* deeply 5 fid its lobes thick, broad, much imbricate. *Corolla tube* narrow or funnel shaped sometimes much elongate lobes of its limb broad twisted to the left in bud. *Stamens* 5 anthers oblong on slender filaments. *Ovary* 2 celled, or 1 celled above style filiform stigma capitate ovules numerous in each cell. *Berry* 1 to 2 celled. *Seeds* numerous immersed in pulp, testa crustaceous albumen horny embryo small, straight—*DISTRIBUTION* About 50 species, in India China, Japan Malaya Australia and the Pacific Islands

Cymes few flowered solitary sessile or nearly so —

Flowers 3 to 6 in long —

Corolla salver shaped its tube narrowly cylindric very little dilated at the throat —

Tube of corolla nearly 3 in long and only about 1 in in diam, limb less than 1 in across

1 *F. tubulosa*

Tube of corolla 4 in long and 35 in in diam limb more than 2 in across

2 *F. canosa*

Corolla funnel shaped from near the base —

Corolla 6 in long

3 *F. auriculata*

Corolla 35 in long

4 *F. Curtisii*

Flowers 125 to 25 in long —

Limb of corolla 1 in across, stamens only slightly exerted —

Corolla lobes oblong blunt, fruit elliptic ovoid, leaves 3 to 5 in long and 1 to 225 in broad

5 *F. obovata*

Corolla lobes rotund oblong fruit globose crowned by the remains of a stout style, leaves 2 to 4 in long and 1 to 175 in broad

6 *F. lincolnata*

Limb of corolla about 75 in across stamens much exerted

7 *F. Walluchiana*

Cymes few flowered but numerous arranged in long usually pedunculate sometimes interrupted terminal racemes

Flowers 2 in long corolla widely funnel shaped, its limb 15 in across

8 *F. Maingayi*

Flowers 1 to 125 in long corolla widely funnel shaped, the limb 75 to 9 in across

9 *F. racemosa*

Cyme solitary on the apex of a short, slender, terminal or axillary peduncle, flowers 115 in long, corolla narrowly funnel shaped, its limb about 75 in across

10 *F. ligustrina*

Cymes spreading corymbose many flowered —

Flowers 15 to 2 in long stamens slightly exerted —

Leaves crenulate 7 to 12 in long, flowers 15 in long

11 *F. crenulata*

Leaves entire, 5 to 9 in long, flowers 2 in long

12 *F. vaginata*

Flowers 5 in long stamens much exerted

13 *F. fragrans*

## SPECIES INDIRECTLY KNOWN

Leaves broadly obovate, very coriaceous, fruit 2 in or more in length, ovoid apiculate 14 *F. Ridleyi*

Leaves elliptic oblong, thin when dry, fruit narrowly ovoid tapered to the base, crowned by the remains of the thick style . 15 *F. oblonga*

1 *FAGRÆA TUBULOSA*, Blume Mus Bot Lugd -Bat I 167 (1850) A straggling, glabrous, climbing shrub branches half as thick as a goose quill, terete, pale, sending out rootlets at intervals on the bark of trees. *Leaves* thinly coriaceous, oblong elliptic, shortly abruptly acuminate, the base cuneate, both surfaces pale yellowish green, and dull when dry, main nerves 5 or 6 pairs, inconspicuous on both surfaces, midrib conspicuous length 4 to 8 in, breadth 1.75 to 2.5 in, petiole 8 to 1 in long. *Flowers* about 3 in long, sessile, 3 or 4 crowded in a sessile glomerulus at the apex of a branch, with a subcampanulate bract, 1.5 in long, at the base of each. *Calyx* 4 in long, fleshy, tubular, the mouth with 5 short broad, imbricate teeth. *Corolla* 3 in long, salver-shaped, the tube slender, cylindric, very slightly wider at the throat, 1 in in diam, limb divided to its base into 5 oblong oblanceolate lobes 4.5 in long. *Stamens* attached near the mouth of the tube and slightly exerted beyond it. *Ovary* narrowly ellipsoid, tapering into a glabrous style about as long as the corolla, stigma capitate. *Fruit* unknown. Miq Fl Ind Bat II 373

PERAK *Scortichini* 1839 *King's Collector* 5748, at Bujong Malacca *Ridley* 9738 — *DISTRIB* Bangka, Sumatra

2 *FAGRÆA CARNOSEA*, Jack in Mal Misc II n 7, 81 (1822) Epiphytal, glabrous young branches as thick as a swan's quill smooth, pale brown when dry. *Leaves* coriaceous elliptic, sometimes subobovate or subrotund, the apex rounded or subtruncate, mucronate edges recurved upper surface when dry somewhat olivaceous, the lower dull brown main nerves invisible on either surface, midrib prominent on the lower, depressed on the upper surface length 3 to 4.5 in breadth 2 to 2.5 in, petiole 4 to 5 in long, swollen at the base. *Flowers* fleshy, about 6 in long solitary or in pairs, terminal, with 2 or more short, woody, pointed bracteoles at their bases, sessile or subsessile. *Calyx* narrowly campanulate, nearly 1 in long, its tube very short, the limb with 5 oblong, blunt, suberect lobes. *Corolla tube* 4 in long, cylindric, .35 in in diam at the middle, slightly wider towards the mouth, limb campanulate, about 1.25 in across, with 5 broadly oblong, blunt, spreading lobes. *Stamens* subsessile near the apex of the tube, included. *Style* slightly longer than the tube. *Fruit* the size of a small hen's egg, but narrower and more tapering to the apex. DC Prodr IX 30 Benth in Journ

Linn Soc IX 97, Miq Fl Ind Bat II 374, Clarke in Hook f Fl Br Ind IV 82

PERAK *Scortechium*, Wray 2317, King's Collector 5349, 7296, 8452  
 Ridley 10297 —DISTRIB Burma

3 *FAGRÆA AURICULATA*, Jack in Mal Misc II n 7, 82 (1822) A glabrous shrub, young branches about 5 in in diam, pale *Leaves* thickly coriaceous, oblong-ob lanceolate or -obovate, apex subacute or acute, narrowed from about the middle to the stout petiole, both surfaces pale yellowish-brown when dry main nerves 6 to 8 pairs, spreading, slightly curved, rather conspicuous on the lower surface, invisible on the upper, midrib broad, bold on both surfaces, length 6 to 12 in, breadth 2 35 to 4 in, petiole 5 to 1 25 in long, with 2 rotund, reflexed, stipule like annicles at the base, 5 to 75 in across *Flowers* thickly coriaceous in all their parts, 5 or 6 in long, in terminal cymes of about 3, then pedicels about as thick as a goosequill, minutely adpressed, pubescent, 75 to 1 5 in long, and bearing near the base of the flower one or two pairs of triangular, one ribbed, appressed, large bracteoles *Calyx* ellipsoid, nearly 2 in long, deeply divided into 5 imbricate elliptic or oblong blunt lobes *Corolla* with a cylindric tube about 1 in long and 5 in in diam (when dry), the limb funnel shaped, 3 to 4 in long, with 5 deep, oblong, blunt lobes *Stamens* 5, included the filaments attached to the base of the limb by thickened bases, anthers 65 in long, oblong, deeply bifid at the base the filaments attached by their attenuate apices at the upper end of the notch *Ovary* narrowly ellipsoid, glabrous, style stout, 4 in long, stigma peltate *Fruit* narrowly ellipsoid, blunt, glabrous, 2 25 in or more in length when dry Wall Cat 1596, Wall in Roxb Fl Ind ed Carey & Wall II 34 and 573, Pl As Rar III 15, t 229 Blume Bijdr 1020, and Rumph II t 72, DC Prodr IX 29, Miq Fl Ind Bat II 371, Clarke in Hook f Fl Br Ind IV 83 *F auricularia*, Benth in Journ Linn Soc I 98 Kuntz For Fl II 204 *F imperialis*, Miq in Ann Mus Bot Lugd Bat II 226, t 5 *Willughbeia auriculata*, Spreng Syst curae post 71

Common in all the Provinces —DISTRIB Malay Archipelago

4 *FAGRÆA CURTISII*, King & Gamble, n sp A low spreading tree young branches as thick as a swan's quill, grey, striate when dry *Leaves* very coriaceous, elliptic or slightly obovate, the apex shortly and bluntly acuminate, the base cuneate, both surfaces glabrous, olivaceous when dry, the midrib prominent on the lower surface, faint on the upper, nerves obsolete in both, length 4 to 8 5 in, breadth 2 25 to 3 in, petiole 5 to 75 in long, stout, sheathing at the base *Flowers* 3 5 in long, terminal, in pairs their pedicels stout, compressed, about 5 in long, bearing

2 pairs of broadly ovate, acute, fleshy bracteoles. *Calyx* .7 to .9 in. long, very coriaceous, narrowly campanulate, cut one-third of the way down into 5 rounded lobes. *Corolla* thickly coriaceous, 3.25 in. long, funnel-shaped, tube 1.75 in. long, much widened towards the mouth, limb spreading, with 5 deep broadly elliptic lobes, with obtusely, minutely, and bluntly apiculate apices. *Stamens* slightly exserted, anthers oblong, blunt. *Fruit* unknown.

KEDAH. in Langkawi Island, *Curtis* 1676.

5. *FAGRÆA OBOVATA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II., 33 (1824). Scandent, glabrous, epiphytic, young branches nearly as thick as a goosequill, brown when dry. *Leaves* coriaceous, oblong-oblancheolate to elliptic sometimes obovate, the apex abruptly and shortly acuminate or mucronate, the base cuneate, both surfaces brown when dry, the upper tinged olivaceous, main nerves almost invisible, midrib very prominent on the lower surface, less so on the upper, length 3.5 (rarely 2.5 in.) to 5 in., breadth 1.5 to 2.25 in. (rarely only 1 in.), petiole 6 to 1 in. long, swollen at the base. *Flowers* 2 to 2.25 in. long, sessile or on peduncles 3 in. long, in small terminal sessile cymes of 4 or 5, the cymes with 2 thick oblong bracts at their bases. *Calyx* 5 to 7.5 in. long, 4 in. wide, tubular with 2 thick triangular bracteoles at the base, lobes of limb ovate-elliptic or subrotund, obtuse. *Corolla* funnel-shaped, 1.8 to 2.15 in. long, the tube .75 in. long, narrowly cylindric below, wider upwards, limb 1.5 in. wide, deeply cut into 5 oblong, blunt, spreading lobes, filaments slender, attached near the apex of the tube, shorter than the corolla-lobes, anthers included, oblong, deeply cleft at the base. *Ovary* elliptic, style slightly shorter than the anthers, stigma capitate. *Fruit* elliptic-ovoid, smooth, shining, crowned by the short remains of the style, 1.5 in. long. Wall. Cat. 1595, Blume Bijdr. 1021, and Rumph. II. t. 75, DC. Prodr. IX. 29, Bot. Mag. t. 4205, Griff. Notul. IV. 35, and Ic. Pl. Ind. Or. t. 382, Miq. Fl. Ind. Bat. II. 369, Clarke in Hook. f. Fl. Br. Ind. IV. 83, Kuiz. For. Fl. II. 205. *F. crassifolia*, Blume Rumph. II. 78, fig. 1, and Mus. Bot. Lugd.-Bat. I. 166, Thwaites Enum. 200, Miq. l.c. 373, Wall. Cat. 1602. *F. malabarica* and *F. obovato-javana*, Blume Rumph. II. 29, t. 75, and Mus. Bot. l.c. 164, Wight Ic. 1317. *F. Blumei*, Steud., DC. l.c. 30. *F. coromandeliana*, Wight Ic. 1316, Bedd. Fl. Sylv. t. 224. *F. celebica*, Blume Mus. Bot. l.c. 167. *F. globosa*, Wall. Cat. 1598, DC. l.c. 29. *Willughbeia obovata*, Spreng. Syst. curæ post. 71.

KEDAH. *Curtis*. PENANG. *Curtis* 246, 2432, 3013. PERAK. *Wray* 1139, 2115, 2248, 2426, 2714, 3075, 4181, 4269, *Scortechini* 202, 758, *King's Collector* 3122, 4024, 4878, 5748, 6214, 6438, 7553, 7578, 8855, 10109, 10634, 10776. MALACCA (*Griffith* (K.D.) 3737, *Mungray* (K.D.)

1028, 1030, 1031, Derry 1012 JOHORE Ridley 6312—DISTRIB Malay Archipelago, British India

Following Mr Clarke in Hooker's 'Flora of British India, we have reduced to *F. obovata*, Wall, not only the forms which have received specific names as above quoted, but also those found in British India, there being no constant characters that we can discover to separate them. Some of the specimens from India have however, longer flowers, and the main nerves of their leaves are more distinct than in the majority of Malayan specimens.

6 *FAGRÆA LANCEOLATA*, Blume Bijdr 1021 (1826) Scandent, 30 to 40 ft long, glabrous young branches about as thick as a goosequill, the nodes close together, cinereous when dry. *Leaves* coriaceous, oblong oblanceolate, subacute, the base much narrowed, both surfaces very dark cinereous when dry, main nerves invisible, midrib bold on the lower surface, faint on the upper, length 2.5 to 4.5 in, breadth 1 to 1.75 in, petiole .35 to .5 in long. *Flowers* terminal, pedunculate, solitary or in pairs or in threes, then peduncles subclavate, about 3 in long, bracteolate at the apex, and sometimes with larger bracts at the base. *Calyx* 5 in long, obconic, 5 lobed the lobes coriaceous, fleshy below, rounded, with membranous margins. *Corolla* 3 in long, funnel-shaped, the lobes of the limb spreading, oblong-rotund. *Stamens* 5, exserted. *Anthers* oblong, obtuse, dorsifixed, filaments slender. *Ovary* ovoid, style filiform. *Fruit* obovoid, globose, smooth, shining, nearly 1.5 in in diam, crowned by a short stout fragment of the style, the calyx at its base with 5 subrotund lobes .45 in broad and with broad scarious edges. Blume Rumph II 31, t 77, and Mus Bot Lugd Bat I 167, Miq Fl Ind Bat II 376.

PERAK May 3202, King's Collector 6848 DISTRIB Java

7 *FAGRÆA WALLICHIANA*, Benth in Journ Linn Soc I 98 (1857) A tree?, young branches half as thick as a goosequill, pale brown when dry, glabrous, the leaf scars close together and prominent. *Leaves* coriaceous, narrowly elliptic or oblanceolate, apex acute or shortly acuminate, the base much narrowed and forming narrow wings to the petiole both surfaces glabrous, the upper greenish when dry, the lower brown. main nerves 4 or 5 pairs, curving upwards and forming wide arches 1 to 1.5 in from the edge, rather distinct on the lower surface when dry, invisible on the upper, midrib conspicuous on the lower surface, length 2.25 to 3 in, breadth .6 to 1.1 in, petiole .3 to .5 in long, winged in its upper part. *Flowers* (excluding the stamens) 1 to 1.25 in long, pedicellate, 3 to 5 together in pedunculate lax cymes from the apex and upper leaf-axils. bracteoles few, minute, peduncles about 1 in long, pedicels about .5 in. *Calyx* clavate, about .5 in long, the teeth 5, minute. *Corolla* salver-shaped, 1 in long, the tube cylindric, slender, becoming



wider towards the campanulate limb, limb 65 in in diam, its 5 lobes oblong, obtuse, spreading Stamens 5, their slender filaments inserted near the apex of the tube and exerted 75 in beyond its lobes Anthers (ovate?) Ovary narrowly ellipsoid, tapering to the filiform long-exserted style 2 to 2.5 in long, stigma narrow Fruit ellipsoid, slightly tapered each end, shining, 5 in long *F. lanceolata*, Wall Cat 1599 (not of Blume) Clarke in Hook f Fl Br Ind IV 85 *Cyrtophyllum lanceolatum*, DC Prodr IX 31

PENANG *Curtis* 375 PERAK *King's Collector* 4851 MALACCA *Mainjau* (K D) 1029

8 *FAGRÆA MAINGAYI*, Clarke in Hook f Fl Br Ind IV 84 (1883) A glabrous tree, 40 to 50 ft high, young branches as thick as a swan's quill Leaves large, very coriaceous, oblong to elliptic-oblong, blunt, obtusely apiculate, the base rounded, the edges when dry recurved, upper surface pale or brownish-olivaceous, the lower brown when dry, both dull main nerves 5 to 8 pairs, stout but faint on both surfaces midrib stout on the lower surface, faint on the upper, length 7 to 10 in, breadth 2.75 to 4 in, petiole 5 to 9 in long, stout, slightly dilated at the base Cymes few flowered, subsessile, mixed with some solitary flowers in a terminal, elongate, pedunculate raceme, with a rachis as thick as a goose-quill and 3 to 6 in long, its peduncle 2 to 3 in long Flowers 2 in long, solitary or in shortly pedunculate cymes of 2 or 3, pedicels 5 in long, with 2 pairs of broadly ovate-acute bracteoles at their bases Calyx subglobular or ellipsoid, about 5 in long, cleft nearly to the base into 5 rotund-ovate lobes with scarious margins Corolla funnel-shaped, 1.75 in long, the tube 2 in in diam at the base, but gradually expanding upwards, the limb 1.5 in wide, its lobes 5, broad, blunt Stamens 5, included Ovary narrowly ellipsoid, much attenuate upwards, style slender, stigma turbinate, lobed, included Fruit unknown

PERAK *King's Collector* 8671 MALACCA *Mainjau* (K D) 1033, *Derry* 573

9 *FAGRÆA RACIMOSA*, Jack in Roxb Fl Ind ed Carey & Wall II 35 (1824) A glabrous bush or small tree, 12 to 25 ft high, young branches from half as thick to as thick as a goosequill, pale when dry, and sometimes angled Leaves large, coriaceous elliptic or oblong-elliptic to elliptic-rotund, apex blunt but terminated by a short abrupt acute apiculus less than 5 in long, base cuneate or rounded, both surfaces yellowish olivaceous when dry, the lower paler, main nerves 5 to 7 pairs, spreading, curving upwards and interarching, 1 to 2.5 in from the edge, midrib very prominent on the lower surface, less so on the upper, length 5 to 10 in, breadth 3 to 6 in, petiole 4 to 8 in long expanded at

the base. *Flowers* fleshy, 1 to 1.25 in long, on thick pedicels arranged in small sessile cymelets crowded in a terminal, pedunculate, sometimes interrupted, raceme, from 1.5 to 6 in long, peduncle of the raceme 1.5 to 4 in long, pedicels of the individual flowers 2 to 2.5 in long, bearing at their bases several broad, short, bracteoles. *Calyx* obovoid, 2.5 to 3.5 in long, cleft half-way into 5 broad subrotund lobes. *Corolla* 8.5 in to 1 in long, widely funnel-shaped, the limb 7.5 to 9 in across, divided into 5 blunt oblong spreading lobes 2.5 in long, tube only 2 to 3 in long, abruptly expanding at the throat. *Stamens* 5, included the filaments slender. *Anthers* broadly elliptic, marginate, deeply cleft at the base. *Ovary* narrowly elliptic, style much thicker than and about as long as the filaments. *stigma* capitate. *Fruit* ellipsoid, smooth, 5 in long. DC Prodr IX 29, Benth in Journ Linn Soc I 99, Kunz For Fl II 205, Benth Fl Austral IV 367, Clarke in Hook f Fl Br Ind IV 84. *F. coarctata*, Blume Rumph II 33, and Mus Bot Lugd-Bat I 170. *F. volubilis*, Jack in Roxb l c 36, DC l c 30, Miq Fl Ind Bat II 367. *F. morindaeifolia*, Blume Rumph II 32, t 73, fig 2, and t 79, and Mus Bot l c 169, DC l c 29, Clarke l c 170. *F. Thwaitesii*, F Muell Fragm Phyt Austral II 137. *Kuhlia morindaeifolia*, Reinw in Blume Bijdr 777. *Kentia morindaeifolia*, Steud Nomencl Bot ed 2, I 845. *Urania morindaeifolia*, G Don Gen Hist Diehl Pl IV 663. *Willughbeia racemosa*, Spreng Syst curae post 71.

In all the provinces very common.—DISTRIBUTION Malayan Archipelago, Burma.

VAR *pauciflora*, King & Gamble. *Leaves* thinly coriaceous, raceme lax, its rachis slender. *Flowers* solitary or in 2 to 3 flowered cymes, not crowded.

PERAK Wray 1960, King's Collector 707, 1926, 3016, 3242. *Scortechini* 112. SINGAPORE Ridley 6315, 8917.—DISTRIBUTION Sumatra (Forbes 1927), Java.

10 FAGRÆA LIGUSTRINA, Blume Rumph II 33 (1836). A shrub, all parts glabrous, young branches twice as thick as a crowquill, terete, pale yellowish-brown when dry. *Leaves* coriaceous, elliptic to elliptic-oblong, apex shortly and rather bluntly acuminate, base cuneate, both surfaces pale yellowish-brown when dry, main nerves about 4 pairs, spreading at first, then ascending to form wide arches 1.5 to 2 in from the edge, slightly conspicuous on the lower surface, very faint on the upper, midrib stout on the lower surface, slightly channelled on the upper, length 3 to 3.75 in, breadth 1 to 2 in, petiole 2.5 to 3 in long. *Flowers* 1.15 in long, on thick pedicels less than 1 in long, 5 to 10 together in simple or shortly branched terminal or axillary

pedunculate cymes *Calyx* fleshy, 15 in long, pyriform, the mouth with 5 shallow very broad imbricate lobes faintly ciliate at the apex *Corolla* slightly exceeding 1 in in length, the tube narrowly cylindric below, expanding upwards into the narrowly campanulate broadly 5 lobed limb 75 in wide *Stamens* 5, slightly exserted, filaments inserted at the base of the limb, broad, membranous at the edges *Anthers* narrowly oblong, blunt, the base deeply auriculate *Ovary* narrowly ellipsoid, tapering into a style as long as the stamens, stigma narrow *Fruit* clavate, apiculate, smooth, 6 in long (unripe) Blume Mus Bot Lugd-Bat I 171, Benth in Journ Linn Soc I 100, Clarke in Hook f Fl Br Ind IV 85

SINGAPORE *Ridley* 1650, 2783, 8453 *Lobb*

11 *FAGRÆA CRENULATA*, Maing ex Clarke in Hook f Fl Br Ind IV 83 (1883) A tree (or a climber?), all parts glabrous, young branches 75 in thick, the older with prominent leaf scars close together, yellowish brown *Leaves* coriaceous broadly obovate rotund, with no petiole, but abruptly narrowed above the base and embracing the branch, both surfaces dark brown when dry the edges minutely crenate, main nerves 4 or 5 pairs, spreading, prominent on the lower surface, slightly depressed on the upper, length 7 to 12 in, breadth 5.5 to 8 in at the broadest part, but 1 in or less at the contracted part above the attachment to the branch *Flowers* coriaceous, 1.5 in long, on short thick pedicels or sessile, arranged in terminal pedunculate compound trichotomous cymes with divaricating 4 angled branches, peduncle of cyme compressed, 1 to 3 in long, with 2 spreading thick concave bracts at its apex *Calyx* 35 in long, campanulate, cut half way down into 5 unequal broad blunt suberect lobes *Corolla* 1.25 in long, clavate in bud, funnel shaped the tube narrowly cylindric, 2 in long, the limb funnel shaped, cut a quarter of its length into 5 blunt lobes *Stamens* 5, included, filaments attached to the mouth of the tube, anthers oblong, deeply bifid at the base, the cells parallel *Ovary* glabrous, ellipsoid conic, tapering into the thin exserted style, stigma obconic *Fruit* ellipsoid (unripe 75 in long)

KLANG *Ridley* 9552 PERAK *Scottichini* 1642 MALACCA *Mann-gay* (K D) 1032, *Ridley* 1284 SINGAPORE *Ridley* 7552

12 *FAGRÆA VAGINATA*, King & Gamble n sp A large glabrous shrub or small tree sometimes apparently a climber, young branches from 25 to 35 in in diam, yellowish-cinereous when dry and somewhat 4-angled *Leaves* thickly coriaceous, elliptic to obovate-elliptic, blunt or slightly apiculate, much narrowed at the base upper surface olivaceous, the lower brown when dry main nerves 5 or 6 pairs, curved, spreading, very prominent on the lower surface, faint on the upper,

midrib very stout on the lower surface, much more slender on the upper, length 5 to 9 in, breadth 2.75 to 4 in, petiole about 1 in long, expanding into a sheath at the base. *Flowers* 2 in long, collected in lax terminal cymose corymbs, 4 in long, and about as much in breadth, the branches 1.25 to 1.75 in long, each bearing an umbellate 3 flowered cyme, lower bracts linear-oblong, blunt, 1 in long, the upper only 1.5 in long, pedicels about .5 in long, bracteolate at the apex. *Calyx* 8 or 9 in long, narrowly tubular in its lower part, the upper much wider, the mouth with 5 broad, blunt, erect lobes, 2 in long. *Corolla* 1.5 in long, its tube .5 in long, the limb widely funnel shaped, with 5 broad, blunt, spreading lobes. *Stamens* 5 filaments attached to the mouth of the tube shorter than the corolla limb attached to the oblong anthers at the apex of them deep basal notch. *anthers* 2 in long. *Ovary* ovoid, apiculate, style much shorter than the corolla stigma conical. *Fruit* ovoid cone crowned by the short style, glabrous, shining, 1.75 in long.

PERAK *Wray* 1084, 1992 *King's Collector* 3868, 4041, 4238, 6605, 10124, *Scortechini* 817. SINGAPORE *Ridley* 7607 — DISTRIBUTION *Jav.*, *Anderson* 289 *Forbes* 827.

Named from its sheathing petioles allied to *I. oborata* Wall.

13. *FAGRAA FRAGRANS*, Roxb Fl Ind ed Carey & Wall II 32 (1824). A tree, 100 to 150 ft high, all parts glabrous young branches much thinner than a goose quill, shining, yellowish-brown when dry, the nodes close together. *Leaves* thinly coriaceous, small or unequal to elliptic, the apex shortly and abruptly acuminate, the base much narrowed, the edges (when dry) slightly waved and recurved, both surfaces olivaceous-brown when dry, the lower the darker, subglandular main nerves 5 to 8 pairs, subhorizontal, faint on both surfaces midrib prominent on both, but especially on the lower surface length 2.25 to 4 in petiole 3 to 6 in long. *Cymes* axillary or terminal, much branched pedunculate, corymbose, 20- to 30-flowered. *Flowers* .5 in long (excluding the much exserted stamens and style). *Calyx* under 1 in length, campanulate, with 5 rounded lobes. *Corolla* salver shaped .5 in long, its tube narrow, limb with 5 somewhat unequal, ob long, blunt, spreading lobes. *Stamens* exserted for more than .5 in anthers elliptic, filaments slender. *Ovary* ovoid, glabrous, style longer than the stamens. *Fruit* subglobose, reddish, 3 in in diam. Roxb Fl Ind I 461, Wall Cat 1597 Miq Fl Ind Bat II 375, Kunz For Fl II 205, Clarke in Hook f Fl Br Ind IV 85 *F. peregrina*, Blume Rumph II t 80, Field and Gardn Ser t 6 *Cyrtophyllum fragrans*, DC Prodr IX 31 *C. peregrinum*, Reinw, Blume Bijdr 1022, DC l c.

PENANG *Curtis* 314 PERAK *Low* 130, *Scortechini* 993, 2045, *King's Collector* 6073, 6175 MALACCA *Maingay* (K D) 1026, *Griffith* (K D) 3735, *Derry* 53, 272 SINGAPORE *Schomburgk* 38, *Ridley* 8921, & *King* —DISTRIB Malay Archipelago

## SPECIES IMPERFECTLY KNOWN

14 *FAGRÆA RIDLEYI*, King & Gamble, n sp Epiphytal, quite glabrous, young branches as thick or nearly twice as thick as a swan's quill, brown when dry *Leaves* thickly coriaceous, obovate, the apex broad and rounded, much tapered to the base, both surfaces pale yellowish-brown when dry, main nerves 5 pairs, ascending, rather straight, very stout and prominent on the lower surface like the broad midrib, length 5 to 9 in, breadth 3.5 to 6 in, petiole 1 to 1.5 in long, very stout, expanded at the base *Flowers* unknown *Fruit* 2 in or more in length and 1.25 in in diam (when dry), in terminal cymes, ovoid, apiculate, shining the calyx at its base 1 in long, campanulate, with 5 broad rotund lobes, coriaceous

MALACCA on Mount Ophir, *Ridley*, 3785 SINGAPORE *Ridley* 2767, 5845, 11363

15 *FAGRÆA OBLONGA*, King & Gamble, n sp A small tree (or epiphyte?), young branches about as thick as a goose-quill, the internodes short, when dry brownish and shining *Leaves* thinly coriaceous elliptic-oblong, the apex shortly and rather abruptly acuminate, the base cuneate, edge slightly reflexed, both surfaces shining when dry, pale, the upper olivaceous, the lower tinged with yellow, midrib prominent on both, but especially on the lower surface, main nerves invisible, length 5 to 11 in, breadth 1.75 to 2.75 in petiole .75 to 1.5 in long *Flowers* unknown *Fruit* narrowly ovoid, tapered to the base, shining, crowned by the remains of the thick style, 2 in long and about 1.25 in in diam

PERAK at elevations of about 3500 ft, *Scortechini*, *King's Collector* 5430, 8445, *Wray* 2992, *Ridley* 5558

6 *STRYCHNOS*, Linn

Trees or scandent shrubs, usually with short, axillary, clavate tendrils *Leaves* opposite, with 3 to 5 or more ribs starting at or a little above the base, other nerves less conspicuous *Flowers* usually white or yellowish, in terminal or axillary, usually corymbosely paniculate, cymes, bracts and bracteoles small *Calyx* small, 5- or 4-partite *Corolla* hypocrateriform or campanulate, lobes 5 or 4, valvate *Stamens* 5 or 4, inserted at the throat of the corolla-tube or below it, filaments short, filiform, anthers ovate or oblong, with distinct parallel cells

*Ovary* 2-celled (or 1 celled in the upper part) ovules many in each cell, style long or short, stigma capitate or obscurely 2 lobed *Fruit* a berry, usually globose, indehiscent, with a hardened pericarp *Seeds* many, or by abortion 1 to 2 only, immersed in pulp, variously compressed, or if solitary globose, the hilum ventral albumen usually copious, generally horny, embryo short, with flattened foliaceous cotyledons and short terete radicle *DISTRIB* Tropical and subtropical regions of both hemispheres, species about 100

In describing the characteristic leaves of this genus we have distinguished between the prominent ' ribs and the less conspicuous nerves

Corolla tube shorter than the lobes, berry usually small, seeds very few —

Corolla tube scarcely any at most 0.25 in long tawny villous within leaves elliptic 1 *S. Maquay*

Corolla tube about 0.5 to 1 in long —

Corolla lobes about 1.5 to 2 in stamens glabrous inserted at the top of the tube leaves ovate 2 *S. Curtisi*

Corolla lobes about 0.75 in stamens villous inserted at the middle of the tube, leaves elliptic ovate or oblong 3 *S. laurina*

Corolla tube equal to or nearly equal to the lobes berry small, seeds few —

Corolla tube and lobes together less than 1.25 in long, leaves chartaceous, ovary rounded glabrous —

Corolla tube and lobes glabrous on both sides, stamens inserted a little above the base of the tube, leaves glabrous brown when dry 4 *S. orifolia*

Corolla tube and lobes sparsely villous without tube glabrous and lobes slightly villous within, stamens inserted at the throat of the tube leaves glabrous yellowish green when dry 5 *S. flavescens*

Corolla tube and lobes glabrous on both sides but lobes within with a dense tuft of bristles at the base, stamens inserted at about two thirds of tube leaves softly pubescent 6 *S. rufa*

Corolla tube and lobes 1.25 to 2.5 in long leaves more or less coriaceous —

Stamens inserted at the top of the tube —

Ovary baccate, corolla lobes within furnished with a dense tuft of bristles at the base, leaves 3 to 5 ribbed 7 *S. malaccensis*

Ovary villous, corolla lobes within villous tufted, leaves 5 to 7 ribbed 8 *S. septemneris*

Stamens inserted at the middle of the tube —

Lobes of corolla glabrous within behind a dense tuft of bristles, leaves usually 5 ribbed, more or less pubescent 9 *S. pubescens*

Lobes of corolla villous within behind a dense tuft of bristles leaves 3 ribbed, nearly or quite glabrous 10 *S. Ridleyi*

principal pair of ribs at the loop sinuses, secondary nerves few, branching, reticulations many, in an elegant network, inconspicuous, petiole 2 to 3 in long, channelled above. *Cymes* pubescent, in rather short axillary sessile corymbs, or in elongate terminal panicles reaching 5 in in length, rachises angular, bracteoles ovate-acute, ciliate, flowers very numerous, the buds obovoid. *Calyx* very small, tube short, lobes ovate-obtuse, ciliate, 0.3 to 0.5 in long. *Corolla*-tube 0.75 in long, glabrous without and at the base within, upper part within and lobes densely long tawny villous, lobes 0.75 to 1 in long. *Stamens* inserted at the middle of the tube, filaments slender, villous, 0.5 in long, anthers as long, sparsely retrorse villous at the base. *Ovary* rounded, villous, tapering into a conical style stigma capitate. *Berry* globose 5 to 1 in in diam, endocarp slightly rough and spotted. *Seeds* 1 to 2, orbicular, flattened on one surface, convex on the other. testa coriaceous. A DC Prodr IX 13, Benth in Journ Linn Soc I 102 Kunz For Fl II 166, Clarke in Hook f Fl Br Ind IV 88 (excl var).

MALACCA *Mamgay* (K D) 1035 PAHANG *Rulley* 2161 —DISTRIB India (Cachar, Burma, Griffith 3727, 3729)

May 1246 from 'lower camp' Gunong Batu Puteh. Perak is also probably this species but the leaves are rather thinner and more lanceolate. So, too, probably are *Scotectinus* 295 and *Kings Collector* 7193 which have very quadrangular branchlets and large leaves, but the specimens are too incomplete for certainty.

4 *STRYCHNOS OVALIFOLIA*, Wall Cat 1592 (1828). A large climbing shrub, branchlets slender, terete, with dark brown shining bark. lenticels few. nodes swollen and with a faint raised line, tendrils none (or not known!). *Leaves* chartaceous, ovate lanceolate or -elliptic acuminate at apex, cuneate at base, glabrous on both surfaces, 3 to 5 in long, 1.5 to 2.5 in broad, brown when dry. 3 to 5 ribbed midrib rather slender, slightly impressed above, raised beneath, as are the 2 inner ribs which start from 2 to 4 in above the base and are curved acutely upwards to the apex, looped only in the upper half, outside them and close to the margin another pair more or less conspicuous with a marginal looped nerve. main nerves 4 to 5 pairs, faint, straight from the midrib to join the principal pair at the loop sinuses. secondary nerves many. reticulations irregular, faintly prominent. petiole slender, 2.5 to 5 in long. *Cymes* axillary, paniculate, reaching about 2 in in length, few flowered, rachis angular, pubescent, bracteoles ovate acute, ciliate, buds obovoid, short. *Calyx* very small, lobes ovate obtuse, pubescent, ciliate, 0.5 in long. *Corolla* tube 0.6 in long, glabrous, as are the lobes on both sides. lobes as long as tube. *Stamens* inserted a little above the base of the tube, filaments slender, anthers elongate, apiculate. *Ovary* rounded glabrous gradually contracted into the slender style, stigma

capitate *Berry* globose, about 75 in in diam, endocarp thin, smooth  
*Seeds* 1 to 3, oblong-orbicular, 8 by 5 in, flat, the margin undulate,  
 testa crustaceous cotyledons cordate A DC Prodr TX 13, Benth  
 in Journ Linn Soc I 103 *S laurina*, Wall, Clarke in Hook f Fl Br  
 Ind IV 88 (*partly*)

PENANG *Wallach* 1592, *Curtis* 3044, 3468 PERAK *King's Collector*  
 4865 MALACCA *Maingay* (K D) 1037

5 *STRYCHNOS FLAVESCENS*, King & Gamble, n sp A large climbing  
 shrub, branchlets slender, stiff, somewhat angular, with pale grey bark,  
 nodes swollen tendrils none (or not known) *Leaves* chartaceous,  
 elliptic or elliptic-lanceolate, acute or acuminate at apex, attenuate or  
 occasionally truncate or cordate at base, both surfaces glabrous, light  
 yellowish green, 3 to 5 in long, 1.5 to 2.75 in broad, 3- to 5-ribbed  
 from close above the base, midrib strong, somewhat impressed above,  
 as is the inner pair of ribs which start at an angle of about 30° and  
 curve upwards to the apex, faintly looped only near the top, outer  
 pair of ribs quite inconspicuous close to the margin and regularly  
 looped main nerves many, irregular, arched, only from 3 to 6 pairs  
 joining the sinuses of the loops of the inner pair of ribs to the  
 midrib secondary nerves many reticulations in an elegant network  
 petiole 3 in long, channelled above *Cymus* terminal, corymbose,  
 minutely yellow-pubescent, reaching 4 in in length and diam,  
 peduncle about 1 in long rachis angular bracts linear or lanceolate  
 often leafy bracteoles ovate acute, enclosing the very short pedicels  
 buds globose flowers minute, pale green *Calyx* campanulate, tube  
 short lobes rounded, ciliate, .05 in long, glabrous within *Corolla* tube  
 cylindric, .05 in long glabrous within lobes 4 or 5, as long as tube,  
 sparsely villous without, more thickly so within *Stamens* inserted on  
 the throat of the tube, filaments extremely short, anthers ovate-acute,  
 not villous, .025 in long *Ovary* globose, glabrous style very short,  
 stigma punctate *Berry* obovoid, about 1 in long, .5 in in diam per-  
 carp very thin, greenish, smooth *Seeds* 2, inner face flattened, outer  
 convex, 6 in long, .5 in broad

PENANG at Waterfall, *Curtis* 3430, 3667 PERAK at Larut, *Scott*  
*Cham* 1498 *King's Collector* 4998 MALACCA at Ayer Panas, *Curtis* 3490

6 *STRYCHNOS RUFA*, Clarke in Hook f Fl Br Ind IV 89 (1883)  
 A climbing (?) shrub branches pale brown, smooth, lenticeolate branch-  
 lets slender, patently rufous pubescent, slightly angular, nodes somewhat  
 swollen, tendrils none (so far as known) *Leaves* chartaceous elliptic or  
 elliptic-ovate, acute at apex, cuneate or rounded or subcordate at base,  
 upper surface sparsely pubescent or glabrate, lower surface softly rufous  
 pubescent 2.5 to 4.5 in long, 1.5 to 2 in broad, 3 to 5 ribbed midrib rather



stout, inner pair of ribs more slender from a short distance only above the base, at about  $40^\circ$  with the midrib, slightly looped above, outer pair inconspicuous, much looped, main nerves 3 to 4 pairs, joining the midrib and side nerves and nearly straight, secondary nerves many, arched, reticulations fairly conspicuous, petiole 15 in long. *Cymes* small, axillary, scarcely reaching 5 in long, 75 in broad, sessile, rufous pubescent branches trichotomous, pedicels slender, 1 in long, bracteoles linear, small, buds small, oblong. *Calyx* very small, lobes ovate, acute, 05 in long. *Corolla*-tube campanulate, 06 in long, glabrous within, puberulous without, lobes a little shorter than tube, also glabrous within, but with a thick white tuft of bristly hairs at the base of each. *Stamens* inserted at about two thirds of the height of the tube filaments very short anthers ovate, apiculate, retrorsely villous hairy below. *Ovary* globose, glabrous, style very short, stigma capitate. *Berry* globose or oblong, 5 to 1.25 in in diam, few seeded pericarp thick. *Seeds* ovate oblong, compressed, 75 in long by 5 in broad albumen thin.

PERAK at Tapu and Relau Tujur Wray 1334, 4033 at Campar, Ridley 9698, King's Collector 3973, 6199, 10187 MALACCA Mangay (K D) 1034 SILLANGOR at Kwai Lumpor, Curtis 2398

We have felt a little doubt about this species which is merely represented by one fruiting specimen in the Kew Herbarium but believe the identification to be correct. The flowers are described from Curtis's specimen the fruits from Mangay's and Wray's 1334.

7 STRYCHNOS MALACCENSIS, Benth in Journ Linn Soc I 101 (1857) A climbing shrub, branchlets dark brown, toment puberulous nodes slightly swollen tendrils pubescent, single or in pairs reaching 1 to 2 in in length, cinate thickened upwards but again reduced at the tip, each replacing a leaf at the ends of the branchlets. *Leaves* subcoriaceous, ovate or elliptic ovate, acute at apex, cuneate to rounded at base, glabrous on both surfaces, except in young leaves and on the midrib beneath 2 to 4 in long, 1.5 to 2 in broad, 3 to 5 ribbed midrib slender, impressed above, inner pair of ribs from about 5 in above the base, starting at an angle of about  $30^\circ$  with the midrib, curving upwards to the apex, looped in the upper third outer pair intra marginal, slender, looped, main nerves about 5 pairs, straight from the midrib to the inner ribs, reticulations many, in an elegant network, petiole 2 to 3 in long, slender. *Cymes* axillary, corymbose, reaching 1 in long and broad, fulvous pubescent peduncles 3 in long, bracteoles very small, pedicels slender, flowers small, greyish white, buds obovoid. *Calyx* very small, tube short, lobes ovate, acute, ciliate, puberulous, 05 in long. *Corolla* tube campanulate, 06 to 07 in long, minutely

pubescent in the upper part within or nearly glabrous, puberulous without, lobes as long as or a little shorter than tube with a dense tuft of pale bristles at the base within, otherwise glabrous. *Stamens* inserted at the top of the tube, filaments very short, anthers ovoid, 0.3 in long, densely hairy, especially with retrorse hairs at the base. *Ovary* conoidal, glabrous, gradually attenuated into a rather thick style 0.5 in long, stigma capitate. *Berry* ovoid, 1 in long by .75 in in diam., pericarp of two layers, outer pergamaceous, shining, thin, inner hard, woody. *Seed* 1, oblong, albumen horny, copious, cotyledons ovate acute, strongly nerved, 1 in long, radicle thick. *Miq Fl Ind Bat II* 379, 1080. *Clarke in Hook f Fl Br Ind IV* 89. *S. cranthierana* Pierre MS in Herb Kew.

PENANG *Curtis* 1515. *Kings Collector* 1539. MALACCA *Griffith (K D)* 3724. — DISPERIB. Burma (Tenasserim or Andamans, *Helley* 3724. Tivoy, *Shaukh Molim* 336). Cambodia.

8. *STRYCHNOS SIPTIMNERVIS* Clarke in *Hook f Fl Br Ind IV* 88 (1883). A climbing shrub, branches stout, obscurely angled, pale brown, sparsely lenticellate, swollen at the nodes and prominently ringed, tendrils none (or not known!). *Leaves* coriaceous, elliptic, shortly acuminate at apex, attenuate at base, glabrous on both surfaces, 2.5 to 4.5 in long, 1.5 to 2.5 in broad, 5 to 7 ribbed, midrib stout, more or less raised on both surfaces, inner pair of ribs from about 2.5 in above the base, strong, acutely angled (about 10° at first) with the midrib and curving upwards to the apex, looped in the upper half, next pair much less conspicuous, outer pair faint or absent, main nerves many pairs arched between the midrib and first side ribs, reticulations strong, prominent on both surfaces, petiole 3 to 4 in long. *Cymes* axillary, sessile, many flowered, reaching 5 in in length but usually shorter, rusty pubescent, rachis somewhat angled, bracts small, ovate, acute, ciliate, flowers rather large, buds oblong-obovoid. *Calyx* very small, lobes ovate, acute or obtuse, ciliate, .05 in long. *Corolla* tube campanulate, .15 in long, glabrous without, pubescent within in upper part and with villous tufts at the throat, lobes 1 in long, recurved, pubescent within. *Stamens* inserted at the top of the tube, filaments short, villous, .025 in long, anthers oblong, apiculate, .05 in long, exsert, villous. *Ovary* conical, villous, gradually narrowed into a .15 in long exsert style, villous below, stigma capitate or obsoletely lobed. *Berry* rather small, reaching .5 in in length, ovoid, pericarp smooth, crustaceous, thin. *Seed* 1, flat, round.

PENANG at Penang Bukit *Curtis* 1021. MALACCA *Murray (K D)* 1036.

9 *STRYCHNOS PUBESCENS*, Clarke in Hook f Fl Br Ind IV 89 (1883) A large climbing shrub, branchlets rather slender, tawny-pubescent, brown, somewhat striate, nodes swollen, with a ring, tendrils single, circinate, tawny-pubescent, enlarged upwards, 1 to 1.5 in long, each replacing a leaf in end branchlets or occasionally axillary. *Leaves* yellow when dry, subcoriaceous, ovate, acute at apex, rounded or sometimes attenuate at base, sometimes cordate on ultimate branchlets, upper surface glabrous or puberulous, lower glabrescent when old, pubescent when young, 1 to 3.5 in long, .75 to 2.25 in broad, 3- to 5-ribbed, midrib and ribs conspicuous, strongly impressed above, inner pair of ribs from about 3 to 6 in above the base, starting at about 30°, outer pair at about 45° with the midrib starting from close to the base, main nerves joining them to the midrib arched, about 6 pairs, reticulations obscure, petiole 1 to 2 in long. *Cymes* small, axillary and subterminal, dense, up to .75 in in diam, tawny puberulous to pubescent, bracts lanceolate, small pedicels short, with 2 bracteoles, buds oblong, flowers white (*calyx* very small lobes rounded ciliate, .04 in long. *Corolla* tube a little longer than the lobes, cylindric, minutely puberulous without, glabrous within lobes glabrous within, but each with a dense tuft of white bristles at its base, tube and lobes together 1.25 in long. *Stamens* inserted on the middle of the tube, sessile or with minute filaments, anthers ovate, .025 in long, apiculate, retorsely sparsely hairy at base only. *Ovary* glabrous, style very short, stigma capitate. *Berry* globose, 3 to 6 in in diam. *pericarp* thin, crustaceous. *Seeds* 1 to 2, flat or concave on one surface, convex on the other, 5 in long by 4 in broad.

PENANG *Curtis* 970, 3649 PERAK at Larut, *Scortechini* 1485, at Relau Tujoi, *Wray* 1916, at Taiping, *Wray* 3048 at Selama, *Wray* 4278, at Larut, *King's Collector* 2441, 3623, 6276, 6477 MALACCA *Mammy* (K D) 1040, *Curtis* 3494 NEGRI SEMBILAN at Perhentian Tinggi *Ridley* 10089 SINGAPORE at Bukit Timah, *Ridley* 6317

*Scortechini*, in his notes on his No 1558 says he thinks that that specimen 'shows some differences from *S. pubescens* which may amount to specific distinction, the flowers being pedicellate, the apex of the anthers obtuse, and the style long. No 1558 is clearly the very last part of a long climbing branch, and such parts often differ a good deal from the more typical parts so that we are doubtful of its being capable of separation and prefer to call it —

VAR *Scortechinii*, King & Gamble. *Leaves* ovate, acute at apex, rounded at base or almost cordate, densely, softly rusty-tomentose on the lower surface, ribs 3 to 5, starting close to the base. *Cymes* small, axillary. *Stamens* inserted above the middle of the tube of the corolla, not apiculate. *Style* longer than in type. *Berry* oblong.

PERAK at Dambung Batak, *Scortechinii* 1858

10 *STRYCHNOS RIDLEYI*, King & Gamble, n. sp. A climbing shrub branchlets slender, terete, nearly black when dry, uppermost only sparsely pubescent, nodes slightly swollen, with a pale line, tendrils single, much circinate, much enlarged upwards, nearly 2 in long. *Leaves* subcoriaceous, nearly black when dry, ovate or ovate-lanceolate, acute at apex, attenuate or rounded at base, glabrous on both surfaces except for faint tufts in the rib axils beneath, 1.5 to 3.25 in long, 1 to 1.75 in broad, 3- to 5 ribbed, midrib strong, impressed above, inner pair of ribs more slender, from 1 to 2 in above the base, starting at an angle of about 30° with the midrib, curving upwards to the apex and distantly looped above, near the margin a very faint pair looped and intramarginal, main nerves few, 2 to 3 pairs, straight to the sinuses of the loops of the side ribs, secondary nerves many, reticulations slender, inconspicuous. *Petiole* 3 to 4 in long, rather stout. *Cymes* axillary, few flowered, puberulous, reaching 7.5 in in length and diameter, peduncles .25 in long. *Bracts* lanceolate, sheathing, ciliate, bracteoles minute rounded or acute. *Pedicels* about .05 in long, buds oblong black when dry. *Calyx* very small lobes broad, obtuse, .04 in long, ciliate. *Corolla* tube campanulate, .075 in long glabrous on both surfaces lobes as long as tube, glabrous without, densely villous within, and furnished at the base with tufts of pale bristles. *Stamens* inserted at the middle of the corolla-tube filaments very short anthers ovate, rounded, .035 in long, sparsely villous at the base. *Ovary* globose, glabrous, with a short style and capitate stigma. *Fruit* unknown.

SINGAPORE at Toas, *Ridley* 6313

This species resembles *S. pubescens* in having the stamens inserted at the middle of the corolla tube and in the globose ovary and short style, but the lobes of the corolla are villous within, and the leaves are quite different.

11 *STRYCHNOS TIEUTÉ*, Losch in Ann Mus Hist Nat XVI 479, t. 23 (1810). A large climbing shrub, branches grey, lenticellate, stiff, branchlets dark brown, slender, nodes somewhat swollen, tendrils single, circinate, much enlarged upwards and at length woody, 1 to 2 in long, glabrous, replacing an occasional leaf of a pair on ultimate branchlets. *Leaves* chartaceous or subcoriaceous, elliptic or elliptic-lanceolate, bluntly caudate-acuminate at apex, acute or rounded at base, both surfaces glabrous, olive-brown, upper shining, 2.5 to 3.5 in long, 1 to 1.5 in broad, 3- to 5 ribbed, midrib slender, impressed above, inner pair of ribs from about 1.5 in above the base, prominent, starting at an angle of 40° or less with the midrib and curving upwards to the apex, looped above the middle, outer pair obscure, forming a faint intra-marginal looped rib more or less to the apex, main nerves 3 to 6 pairs,

reaching the sinuses of the loops of the inner basal ribs, secondary nerves very many, similar to main nerves; reticulations prominent, irregular, petiole .2 to .3 in. long, curved. *Cymes* axillary, corymbose, usually sessile, reaching 1 in. in length and 1.25 in. in breadth, few- (12- to 18-) flowered, peduncles short, branches of rachis very slender, 3-chotomous, bracts linear, short, bracteoles minute, rounded, 2 to each pedicel below the calyx; pedicels puberulous, 1 to .25 in. long, flower-buds clavate, top rounded, flowers white, sweet-scented. *Calyx* very small, lobes ovate-lanceolate, acute, .05 in. long. *Corolla* infundibuliform, tube slender, .2 to .25 in. long, minutely puberulous without, glabrous within, lobes oblong, .1 in. long, glabrous. *Stamens* inserted at the top of the tube, filaments very short, but decurrent in lines down the interior of the tube, anthers oblong, .05 in. long, apiculate, glabrous. *Ovary* ovoid, glabrous, alternated into a .25 in. long style, stigma capitate, obtuse. *Berry* globose, many-seeded, 1.5 to 2.5 in. in diameter, pericarp thick, woody, shining, smooth, yellowish at first, afterwards red. *Seeds* immersed in pulp, rounded, ovoid or oblong, more or less flattened, usually .75 in. long, and about .25 in. broad, testa thin, silvery, albumen horny, cotyledons cordate, acute, 3- to 5-nerved, 15 in. long, radicle stout, cylindric, as long as cotyledons. Bl. Rumph. I 67, t. 24, A. DC Prodr. IX. 13, Miq. Fl. Ind. Bat. II. 380. *S. Maingayi* var. ? *fructuosa*, Clarke in Hook. f. Fl. Br. Ind. IV. 88.

PENANG *Curtis* 709, 1490, *Ridley* 9358 PERAK. *King's Collector* 5348, 10595 MALACCA *Maingay* (K.D.) 1038, *Corporal Ali* and *Corporal Hasan* SINGAPORE *Ridley*. — *DISTRIB.* Java (*Horsfield*, *Zollinger*), Borneo (*Beccari* 1580).

*King's Collector*, No. 10311, from Perak, agrees fairly well with *S. Horsfieldiana*, Miq., but the specimens are too incomplete to warrant description.

## 7 GAERTNERA, Lamk.

Trees or shrubs. *Leaves* opposite, rarely ternate, entire, coriaceous, penninerved, stipules connate into a cylindrical sheath. *Cymes* axillary or terminal, many- or 3- to 1-flowered. *Calyx* small, funnel-shaped or campanulate. *Corolla*-tube longer than the calyx, its limb with 4 or 5 lobes, valvate in bud. *Stamens* adnate to the corolla-tube by short filaments. *Ovary* 2-celled; style short or long. stigmas 2, linear or clavate, ovule solitary in each cell, erect. *Berry* didymous, sub-globose, crustaceous. *Seeds* often compressed, albumen horny or fleshy, embryo small. — *DISTRIB.* About 40 species, in the tropics of Asia and Africa.

Leaves glabrous —

Leaves narrowly elliptic oblong, usually under 4 in length —

Flowers 4 merous

1 *G. vinea*

Flowers 5 merous

2 *G. Koenigii* var  
*[oxyphylla]*

Leaves oblong oblanceolate, much tapered to the long petiole, 7 to 12 in length —

Cymes densely umbellate, crowded

3 *G. oboea*

Cymes laxly paniculate

4 *G. oblanceolata*

Leaves hairy beneath elliptic oblong, slightly narrowed at the base, petiole not very long

5 *G. grisea*

1 *Glaertnera vinea* Hook f ex Clarke in Fl Br Ind IV 91 (1883) A shrub, young shoots as thick as a crow quill, glabrous. Leaves membranous, narrowly lanceolate, apex caudate acuminate, the base much narrowed, both surfaces brown when dry, the upper glabrous the lower minutely scaly, length 2.5 to 3.5 in, breadth 6 to 8 in petiole about 1 in long. Flowers only about 25 in long, in small terminal trichotomous nearly glabrous cymes. Lowest bracts linear, sometimes 4 in long, pedicels very short. Calyx cupular, with 4 spreading teeth. Corolla villous at the throat 4 lobed. Fruit obovoid globose 2 in long. *Psychotria vinea* Wall Cat 8354

SINGAPORE Wallich 8354, Ridley 4828, 9500

2 *Glaertnera Koenigii* Wight Ic 1318 (1850), var *oxyphylla*, Clarke in Hook f Fl Br Ind IV 91 (1883) A small tree, all parts except the inflorescence glabrous, young branches thicker than a crow quill, pale brown, terete. Leaves thinly coriaceous, narrowly elliptic-oblong, sometimes somewhat oblanceolate, apex shortly caudate acuminate, base much narrowed both surfaces pale olivaceous brown when dry, the lower minutely scaly midrib distinct main nerves 6 to 8 pairs, curving upwards, thin but distinct on the lower surface, length 2.5 to 4 in, breadth 8 to 1.35 in petiole 2 to 4 in long. Stipules forming an oblong sheath, 5 toothed or bifid, 25 in long, the apex and ultimately the whole deciduous. Panicles terminal cymose, lax, less than half as long as the leaves when in flower, elongating in fruit, branches divaricate, opposite, the ultimate branches 3-flowered. Flowers 25 in long, on puberulous pedicels longer or shorter than themselves bracteolate near the apex. Calyx short, tubular, irregularly 5 toothed. Corolla tubular, glabrous outside, slightly curved, the mouth with 5 (sometimes 4) thick spreading subacute lobes. Stamens included, anthers linear, slightly bifid at the base, on short filaments. Ovary 2-celled, each cell 1-ovuled. Fruit globular, 3 in in diam, slightly compressed, with a deep vertical groove on each side (subdidymous), glabrous, smooth, the apex areolate, but without remains of the calyx. *G. thysiflora* Blume

Mus Bot Lugd-Bat 174, Benth in Journ Linn Soc I. 112 *G acuminata*, Benth l c *G Junghuhnii*, Miq Fl Ind Bat II 383 *Sykesia Koenigii* and *S thyrsiflora*, Arn Pug Pl Ind Or 35, DC Prodr IX 35 *Psychotria vaginans*, DC Prodr IV 520, W & A Prodr 434 *Psychotria* sp, Wall Cat 8342, 8388 *P oxyphylla* Wall Cat 8374, Benth l c

PERAK at elevations over 3000 ft, *Scortechinii* 305, *King's Collector* 8063, *Wray* 214, 279, 4113, 4122

3 GAERTNERA OBESA, Hook f Fl Br Ind IV 92 (1883) A small shrub, young branches compressed, as thick as a swan's quill or thicker, almost glabrous, pale brown, their apices often quite enveloped in the large stipules. Leaves subcoriaceous, large oblong-lanceolate or oblong-elliptic, shortly acuminate at apex, narrowed at the base into the stout winged petiole both surfaces drying brown, glabrous, the lower minutely lepidote when young, midrib broad main nerves 9 to 12 pairs, slightly curved, ascending, conspicuous on the lower surface, the intermediate nerves also distinct although thin length 9 to 12 in, breadth 3 to 3.5 in, petiole 1 to 1.5 in long, broadly channelled, its upper part winged. Stipules 1.25 to 1.5 in long, coriaceous, broadly oblong, acuminate when young, but afterwards, from the breaking off of the upper part, blunt or obscurely bifid, the base auricled. Cymes (including their peduncles) not much exceeding the leaf petioles in length, usually terminal, densely umbellate, about 1.25 in across, bearing about 3 umbellate main branches compressed and puberulous like the peduncle but much shorter and at the base several linear bracts about 5 in long. Flowers 3 in long, sessile or shortly pedicelled in short, few flowered, broadly bracteolate cymelets on the ultimate branchlets. Calyx campanulate, puberulous outside, the limb obscurely toothed, entire and truncate, enlarging with age. Corolla twice as long as the calyx, fleshy, tubular, the limb with 5 short acute inflexed lobes, glabrous outside densely hairy in the upper half inside. Anthers 5, oblong, blunt, cordate at the base, inserted by short filaments near the base of the tube. Fruit unknown. *Psychotria obesa*, Wall Cat 8328

PERAK *Scortechinii* MALACCA *Mainqay* (K D) 925 SINGAPORE on Bukit Timah, *Ridley* 2680 *Hullett* 118, 137, *Walker* 212

VARIETY *angustifolia*, King & Gamble Leaves not exceeding 2.75 in in breadth. Cymes axillary, 1.5 in long

PERAK *Scortechinii* Only a single specimen collected

4 GAERTNERA ORBLANCEOLATA, King & Gamble, n sp A glabrous shrub, 4 to 8 ft high, branches about as thick as a goose quill, sub-quadrangular, dark-coloured. Leaves subcoriaceous, oblong-ob lanceolate, shortly and somewhat abruptly acuminate, gradually narrowed

from above the middle to the short petiole, both surfaces when dry brown, tinged (especially on the paler lower surface) with olivaceous, the midrib prominent on both, the 10 to 12 pairs of curved ascending main nerves prominent on the lower but indistinct on the upper surface, length 7 to 9 in, breadth 1.75 to 3.5 in, petiole 6 to 1 in long. *Stipules* spathaceous, 1.25 in long, opening on one side, embracing the petiole by a rounded basal wing, the upper part caducous and leaving the irregularly quadrate, persistent, coriaceous, pale, margined base. *Cymes* paniculate, lax, with a few linear deflexed bracteoles, supra axillary, about 3 in long (longer in fruit), one-third being peduncle, the branches few, lax, the lower deflexed. *Flowers* in threes rather crowded towards the apices of the branches, on thick pedicels shorter than themselves, before expansion only about 1 in long. *Calyx* cylindric, the mouth under 1 in in diam, very shortly 5 toothed, glabrous outside like the corolla. *Corolla*-tube twice as long as the calyx, constricted above the middle, the lobes triangular, thick the throat very hairy inside. *Anthers* hidden amongst hairs their filaments short. *Ovary* 2 celled, the cells 1 ovuled. *Fruit* glabrous, obliquely obovoid or globular, but somewhat contracted at the base, crowned by the minute remains of the calyx, about 3 in in length. *Seed* (by abortion) solitary, with much horny albumen.

PERAK *Scortechini* 203 *Wray* 1948, 2283 *King's Collector* 8449

5 GAERTNERA GRISEA, Hook f Fl Br Ind IV 92 (1883). A small bush young branches as thick as a swan or goose quill, compressed, pale, minutely pubescent. *Leaves* coriaceous, large, oblong or elliptic oblong, apex shortly acuminate, base rounded or cuneate, edges slightly recurved, upper surface glabrous, lower softly pale cinereous pubescent main nerves 8 or 9 pairs, oblique, slightly curved, bold on the lower surface, faint on the upper, midrib broad, prominent on the lower surface (when dry) flat on the upper. length 8 to 11 in, breadth 2 to 4.5 in petiole .35 to .75 in intra petiolar stipules united to form an adpressed cinereous-pubescent sheath, .75 in long, with 1 or 2 apical points. *Cymes* terminal or axillary, solitary, .25 to .5 in long and 2 to 3 in across, cinereous pubescent everywhere, on peduncles 1 to 4 in long, trichotomous and with small triangular bracts at the divisions. *Flowers* .25 to .3 in long. *Calyx* under 1 in long, campanulate, with 5 broad, triangular, spreading teeth. *Corolla* .2 to .25 in long, thick, cylindric limb short, with 5 deep, oblong lanceolate, valvate lobes with inflexed tips. *Anthers* 5, linear, inserted by short filaments below the glabrous throat. *Style* thick, stigma with 2 broad lobes. *Ovary* 2 celled, ovules numerous. *Fruit* unknown. *Psychotria*?, Wall Cat 8389.

JOHORE *Ridley* 11123, *Murton* 159 SINGAPORE *Wallich*, *Ridley* 2697



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## ASIATIC SOCIETY OF BENGAL.

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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department

### No 20

The present Part contains the descriptions of three Families, No 89 *Acanthaceæ*, which was only finished by the late Mr. C. B. Clarke, F.R.S., just before his lamented death in August, 1906, and Nos 91 *Labiataæ* and 92 *Plantaginaceæ*, which have been done by Lt.-Col. Prain, C.I.E., F.R.S., Director of the Royal Gardens, Kew.

The 3 Families comprise 54 genera and 166 species. In the *Acanthaceæ* there are 35 genera and 134 species, of which 5 genera and 68 species are new. In the *Labiataæ* the genera are 18 and the species 31, one genus being newly described. But it is worthy of note that of the 31 species only 16 are really native in the Malay Peninsula, the rest being introduced plants. One species only is endemic, *Plectranthus Kunstleri*, Prain. In *Plantaginaceæ* there is merely one genus containing one species, an introduced weed.

It may here be usefully recorded that, in addition to his work on the Malay Peninsula *Acanthaceæ* herein given, the late Mr. Clarke also prepared an account of the species of the Malay Archipelago, which will shortly be published in the 'Journal of the Linnean Society.'

Part No. 21, which will contain two Families, No. 86 *Gesneraceæ* and No 90 *Verbenaceæ*, and thus complete the Gamopetalæ, may be expected to issue about the New Year.

## Family LXXXIX — ACANTHACEÆ

[By C B CLARKE]

Herbs or shrubs, or twining plants (*Thunbergia*) Leaves opposite, often unequal, in *Polytremia* sometimes pseudalternate, stipules 0 Inflorescence various, spikes strobilate or heads or cymose or flowers solitary, bracts and prophylla large, small or 0 Flowers 2-sexual, irregular Calyx inferior, segments 5 or 4, nearly free or more or less united Corolla gamopetalous, tube campanulate or linear, limb 2 lipped or 5 lobed, more or less 1 sided Stamens on the corolla 4 didynamous, or 2 (with or without rudiments) anther cells 2 or 1, pollen ellipsoid (then usually ribbed or banded longitudinally) or globose (then often honeycombed or echinulate) Ovary superior, 2 celled ovules 2 to 1, or several, superimposed in vertical rows (or 2 collateral in *Thunbergia*), style long, simple, minutely 2 fid Capsule loculicidal, often elastically dehiscent seeds usually nearly as many as the ovules, held up on rigid curved retinacula (outgrowths of the funicle), albumen 0 DISTRIB Species 2000, throughout the warmer parts of the world

This Family is specially characterized by the retinacula and the seeds placed in a vertical line, this character fails in the first two Subfamilies The plants of Subfamily II NELSONIOIDÆ are frequently mistaken for those of SCROPHULARIACEÆ from which they differ by the seeds being superimposed vertically

## CONSPECTUS OF THE SUBFAMILIES, TRIBES, AND GENERA

- Subfamily I THUNBERGIOIDÆ Seeds 4 to 2 in the capsule without retinacula Twiners . 1 THUNBERGIA
- Subfamily II NELSONIOIDÆ Seeds 8 to 16, vertically superimposed in 2 rows in the capsule on small soft papillæ (not on hard curved retinacula) Herbs small or of very moderate size
- Stamens 2 . . . 2 NELSONIA
- Stamens 4 —
- Flowers in spikes, racemes, or panicles 3 STATUOGINE
- Flowers axillary 4 CARDANTHERA
- Subfamily III RUELLIOIDÆ Retinacula present Corolla lobes contorted in the bud —
- Tribe 1 RUELLIINÆ Capsule with more than 4 seeds, which are hygroscopically shaggy on the margin —
- Pollen honeycombed Flowers axillary Capsule clavate 7 RUELLIA
- Pollen echinate Capsule seed bearing from the base . 8 APOUELLIA
- Pollen ellipsoid, with many longitudinal ribs Capsule hardly stalked —

- Corolla distinctly 2 lipped —
- Spikes continuous or axillary clusters .. . 5 HYGROPHILA
- Flowers in 1 sided axillary open racemes .. . 6 NOMAPHILA
- Corolla obscurely or scarcely 2 lipped —
- Thyrus terminal, 8 to 12 by 75 in .. . 9 STENOXYRHUS
- Spikes terminal or short peduncled heads . 10 HEMIGRAPHIS
- Tribe 2 SIBORIANTHINÆ Capsule with 4 (or 2) seeds —
- Pollen ellipsoid, longitudinally ribbed —
- Stamens 4 . .. . 12 STROBILANTHIS
- Stamens 2 .. . 11 ENDIOGON
- Pollen globose, echinate Stamens 4 . 13 ACANTHIALF
- Subfamily IV ACANTHOIDEÆ Retinacula present Corolla with the posticous lip cut away, anticus lip 3 lobed, the middle lobe bifid . . . 14 ACANTHUS
- Subfamily V JUSTICIOIDEÆ Retinacula present Corolla lobes imbricated in the bud, *i.e.* one lobe wholly within, one wholly without, the others —
- Tribe 1 GYMNOSTACHYINÆ Capsule with more than 4 seeds Bracts inconspicuous hardly as long as the small sepals which rarely attain one fifth inch in length Stamens 2 —
- (capsule cylindric at base seeds in the clavate top .. 16 PHLOGACANTHUS
- Capsule with parallel sides, seed bearing from the base —
- Corolla tube cylindric scarcely inflated —
- Seeds hygroscopically hairy on the margin .. 15 GYMNOSTACHYUM
- Seeds glabrous, stony .. 17 ANDROGRAPHIS
- Corolla tube much inflated upwards 18 CYSTACANTHUS
- Tribe 2 AXYSTASIINÆ Capsule with 4 seeds Stamens 4 —
- Sepals united at base for at least one third of their length 20 PHYLACANTHUS
- Sepals nearly free at base —
- Capsule at base cylindric, seeds in the upper wider part —
- Anther cells at equal height 19 AXYSTASIA
- One anther cell below the other . 21 PITTIA
- Capsule conic, the 4 seeds near the base 22 LEPTOGATHIS
- Tribe 3 BARIERINÆ Capsule 2 to 4 seeded Stamens 2 fertile Calyx large 4 partite to the base Anther cells 2, rounded at base Pollen globose, reticulated Corolla yellow, 1 25 in long . . . 23 BARLERIA
- Tribe 4 ERANTHEMINÆ Capsule 4 to 2 seeded Stamens 2 Anther cells 2, rounded at base Corolla tube linear, limb subequally 5 nd, spreading .. . 24 ERANTHEMUM
- Tribe 5 JUSTICIINÆ Capsule 4 to 2 seeded Corolla distinctly 2 lipped Stamens 2 Calyx small subequally deeply lobed Seeds smooth or tuberculate, but without needle like hygroscopic hairs —
- Sect 1 MONOTHECIÆ Anthers 1 celled —
- Corolla 1 25 in long, orange red .. 25 CLINACANTHUS
- Sect 2 TYPICÆ Anthers 2 celled The flower not appearing as though enclosed between two opposite bracts Placentæ in fruit not rising elastically from the base of the capsule —

- One anther cell below the other, tailed .. .. 26 JUSTICIA  
 One anther cell somewhat below the other, its base  
 rounded or acute, scarcely tailed —  
   Corolla tube broad Shrub .. 27 ADHATODA  
   Corolla tube linear, posticous lip small, twisted 28 RHINACANTHUS  
 Anther cells at equal or nearly equal height, not tailed —  
   Corolla 3 to 7 in long —  
     Spikes, racemes or panicles terminal .. 29 LEDA  
     Cymes small axillary . . 30 POLYTREMA  
   Corolla 1.25 in long —  
     Corolla green blue 31 EUCBOTIUM  
     Corolla red 32 GRAPTOHYLLUM
- Sect 3 *HYPOCISTIS* flower appearing as though en-  
 closed between two bracts Placenta in fruit not rising  
 elastically —  
   Anther cells 2 one placed higher 33 PFRIETROPHE  
   Anthers 1 celled 34 HYPOCISTIS
- Sect 4 *SORVIA* Placenta rising in fruit elastically from  
 the base of the capsule and throwing out the seeds —  
   Flowers in spikes, with prominent bracts 35 RUNGIA

## 1 THUNBERGIA, LINN f

[Character narrowed, as throughout *Acanthaceæ*, to the Malay Penin-  
 sula species]

Twiners *Leaves* petioled, opposite subequal, undivided, often  
 toothed or lobed *Peduncles* solitary, axillary, running into terminal  
 racemes, &c the upper floral leaves (or bracts) greatly reduced, incon-  
 spicuous or obsolete *Bracteoles* (prophylla) large, often 5 in long,  
 broad oblong from a truncate base *Calyx* of 8 to 14 small lanceolate  
 teeth, or obsolete (appears a mere rim) *Corolla* large, tube cylindric  
 or campanulate limb of 5 subequal lobes, contorted in the bud  
*Stamens* 4, subsimilar, anther cells 2, parallel, sometimes strongly  
 spurred at the base, pollen large (50 to 60  $\mu$  in diam), globose, smooth,  
 with faint spiral bands or strongly spinous *Ovary* 2-celled, with 2  
 ovules in each cell, stigma of 2 equal, opposite, triangular lobes *Cap-*  
*sule* globose, with a long oblong-linear beak, seeds 4, or by suppression  
 3 to 2, hemispheric, excavate on the plane face, wrinkled on the spheric  
 face, sessile, not held aloft on retinacula — **DISTRIB** Species 100, in the  
 warm parts of the Old World, most numerous in Africa, extending to  
 Australia

Sect 1 *Calyx* a mere rim Anther cells spurred Pollen  
 smooth —

- Leaves broad oblong, entire or slightly toothed .. 1 1 *laurifolia*  
 Leaves round ovate, toothed or often lobed .. 2 1 *grandiflora*

Sect 2 Calyx of 8 to 12 teeth Anther cells not spurred

Pollen spinous —

Petioles not winged	Corolla pure white	3 <i>f. fragrans</i>
Petioles often winged	Corolla yellow, with claret eye	4 <i>f. alata</i>

1 THUNBERGIA LAURIFOLIA Lindl in Gard Chron p 260 (1856)  
Scandent, up to 150 ft long (Kurz) Leaves 3.5 by 1.5 in, broad  
oblong, wide at base, truncate or ovate, glabrous, sub-3 nerved, entire  
or slightly toothed, petioles 5 to 1 in long Peduncles axillary,  
solitary, distant or more often running into terminal close racemes  
2 to 5 in long, bracteoles (prophylla) 1 in long, oblong, usually  
slightly pubescent Calyx a mere rim Corolla 2 in long, blue or  
blue and white, tube campanulate, only contracted for a very short  
space at the base Stamens 4, subsimilar, filaments glabrous, anther  
cells with a rigid long spur at the base, fringed with many long pilose  
hairs, pollen globose, large (50  $\mu$  in diam), smooth, with obscure  
broad spiral bands Pistil glabrous, the two stigmatic lobes sub  
opposite Capsule globose, smooth, brown, 25 in in diam, with 4 to  
2 seeds beak 1 to 1.25 in long, oblong linear Seeds hemispheric,  
cotyledon granular, excavated on the plane face Hook Bot Mag  
t 4985 Kurz For Fl II 240, C B Clarke in Hook f Fl Br Ind  
IV 392 Lindau in Engl Jahrb XVII (1893) Beibl 41, pp 41 42 and  
in Engl & Prantl Pflanzenfam IV 3B, 292 Ridley in Trans Linn Soc  
ser 2 III (1893) 332 *T. Harmsii*, Hook Bot Mag t 4998

MALACCA *Mamgay* (K D) 1170 Thoban Isle *Helcyer* Goping  
King's Collector 1064 PERAK *Wray* 3145 *Scortechini* 9197 King's  
Collector 3030 8418 PULAU MANIS fide *Ridley* PENANG and KEDAH  
*Curtis* — DISTRIB Northwards to Arracan

2 THUNBERGIA GRANDIFLORA, Roxb Hort Beng 45 (1813 to  
1814) Leaves ovate or rounded 3 to 6 in in diam, pubescent beneath,  
palmately 5 to 7 nerved from the base, usually angular or lobed, rarely  
nearly entire otherwise as *T. laurifolia* Roxb Fl Ind III 34  
Hook Bot Mag t 2366 Nees in DC Prodr XI 51 (with all syn  
except Roxb Cor Pl t 67), Kurz For Fl II 240, C B Clarke in  
Hook f Fl Br Ind IV 392, Lindau in Engl Jahrb XVII (1893)  
Beibl 41, pp 37, 39, and in Engl & Prantl Pflanzenfam IV 3B, 292  
Hemsl in Journ Linn Soc XXVI (1890) 237, Prain Beng Plants  
796 *Flemingia grandiflora*, Rottler in Neue Schi Gesell Nat  
Freunde IV (1803) 202

SINGAPORE *Schomburgk* 84 — DISTRIB Bengal to South China  
Perhaps *Schomburgk*'s specimen was from a cultivated plant

This species runs excessively close to *T. laurifolia* but Lindau has put *T. grandiflora* in a different Section because it has 'flowers solitary, axillary' The inflores

cence is exactly the same in both species, in *I. grandiflora* the flowers are very generally in terminal racemes, the upper bracts (floral leaves) being often only 25 to 5 in long

3 *THUNBERGIA FRAGRANS*, Roxb Cor Pl I 47 t 67 (1795) Twining, often 4 to 8 ft long Leaves 3 by 1 to 15 in, oblong or elliptic, obtuse, rounded or hastate at base, nearly entire, nearly glabrous or (in form *javanica*) pubescent, sub-3-nerved, petiole 25 to 5 in long Peduncles 1 to 3 in long, axillary, solitary, rarely two together, bracteoles (prophylla) 5 to 7 in long, oblong-lanceolate Calyx of about 12 narrow-oblong teeth 15 in long Corolla white, tube 5 to 75 in long, narrow-oblong, contracted at top and bottom, limb of 5 obovate, emarginate, spreading lobes Stamens 4, in the corolla tube, glabrous, anthers not spurred, pollen globose (50  $\mu$  in diam), the borders of the spiral bands carrying spines so long that the bands are obscured Pistil glabrous, the 2 stigmatic lobes opposite Capsule cuboid globose, 4 in in diam, beak 8 in long, oblong linear Seeds 4 (or by suppression fewer), hemispheric, cerebroid, granular, with a hole in the plane face Nees in DC Prodr XI 56, Kurz For Fl II 240 C B Clarke in Hook f Fl Br Ind IV 390 (*with all syn*) Lindau in Engl Jahrb XVII (1893) Beibl 41, pp 36, 38 and in Engl & Prantl Pflanzenfam IV 3 B, 292 Ridley in Trans Linn Soc ser 2 III (1893) 332 and in Journ As Soc Straits 121 (Singapore 1900) Hemsl in Journ Linn Soc XXVI (1890) 237 Prain Beng Plants 795

PIKAN fide Ridley — DISTRIB Throughout India, extending to Timor Philippine Islands (Palawan, *Bermijos* 193)

FORMA  $\beta$  *javanica* (sp), Gaertn f Fruct III (1805) 22 t 183, fig 4 leaves beneath, petioles, and peduncles pubescent (in Wiay 52, rufous shaggy) Blume Bijdr 806, Moritz! Verz Zollinger Pfe 46 Hassk Cat Hort Bogor 147

SINGAPORE Kunth 25 Ulu Kenring, Wiay 52 KFDAN Curtis

DISTRIB Throughout Malaya to North Australia

4 *THUNBERGIA ALATA*, Sims Bot Mag t 2591 (1825) Villous Leaves cordate ovate, subentire petioles 1 to 2 in long, often winged Corolla yellow or nearly white, tube with a dark claret mouth, exactly cylindric, twice as thick as that of *T. fragrans*, otherwise resembling *T. fragrans* Bojer Hort Maurit 259 (1837), Hook Exot Fl III t 177 Bot Mag t 3512, Kurz For Fl II 240, C B Clarke in Hook f Fl Br Ind IV 491, Lindau in Engl Jahrb XVII (1893) Beibl 41, 37, 40, and in Engl & Prantl Pflanzenfam IV 3 B, 292, Burkill in Dyer Fl Trop Afr V 9, 16, Prain Beng Plants 795, Ridley in Journ As Soc Straits 121 (Singapore 1900)

SINGAPORE *Kunstler* 151, *Deschamps* —DISTRIB Native in warm Africa and Mascarenia, a common plant, runs wild as a weed in India and South-East Asia

## 2 NELSONIA, R B1

A diffuse herb *Leaves* opposite, subequal *Flowers* small, in dense small spikes, bracts spiral or alternate (not opposite) *Calyx* small, sub 4-lobed *Corolla*-tube slender, limb 2-lipped *Stamens* 2, anthers 2 celled, subincluded in the corolla-tube *Ovary* 2-celled, ovules about 8 in each, arranged vertically in two rows on the double placental line in each cell *Capsule* ovoid-conic, with 8 to 16 seeds in the basal half retinacule 0 —DISTRIB Species 1, in warm parts of Africa, India, Australia, America

N B - This plant is often sorted amongst SCROPHULARIACEÆ, nor does it differ except by the arrangement of the ovules and seeds in one vertical line on the margin of the carpellary leaf

1 NELSONIA CAMPFSTRIS, R Br Prodr 481 (1810) Prostrate hairy branches often 12 to 18 in long *Leaves* of stem 2 to 3 in long oblong or obovate, nearly entire, long petioled or nearly sessile basal leaves often 6 in long *Flowers* in small heads, 5 in in diam terminal or on axillary peduncles which lengthen out in fruit to 2 to 3 in bracts ovate, 15 in long bracteoles very small *Calyx* 125 in long 2 lipped one lip deeply 3 fid the other shortly 2 fid *Corolla* 15 in long, rose or white *Pistil* glabrous style shortly 2 fid *Stamens* 2 anther of 2 ellipsoid cells half divergent pollen globose, 25  $\mu$  in diam, subtetrahedral (almost as in *Scrophulariaceæ*) *Capsule* 15 in long, seeds ellipsoid, brown, granular Endl Iconogr t 79, Benth Fl Austral IV 543, C B Clarke in Hook f Fl Br Ind IV 394 (*with all syn*), Burkill in Dyer Fl Trop Afr V 28, Prain Beng Plants 797 *N. tomentosa*, Nees in Wall Pl As Bar III (1832) 79 Nees in DC Prodr XI 65, Miq Fl Ind Bat II 770 *N. brunelloides*, O Kuntze Revisio I 493, Lindau in Engl & Prantl Pflanzenfam IV 3 B, 289, t 110, fig c

KEDAH *Ridley* 8312 PENANG *Curtis* 50, 1750, *Deschamps* PAHANG *Ridley* 2181 —DISTRIB In warm regions of both hemispheres

The innovations are often densely white hairy, there are also often long white hairs at the base of the flower The var  $\beta$  *vestita*, of Fl Br Ind IV 395 (which has large leaves, up to 8 to 10 in long on the branches), is frequent in Lower Burma, but there is no example of it from the Malay Peninsula



## 3 STAUROGYNE, Wall

Undershrubs, 6 to 24 in (rarely 3 to 4 ft) high, at base often woody, creeping, hairy (in *S. subglabra* nearly glabrous) *Leaves* opposite, equal, simple, entire, petioles usually long, rarely short, 25 to 5 in. *Flowers* in spikes (or spike like racemes, the pedicels up to 15 in), dense or lax, the spikes sometimes panicle. *Bract* usually a little longer than the calyx, sometimes considerably broader, two prophylla (often alternate), linear or nearly linear, a little shorter than the bract. *Calyx* 15 to 6 in long, divided nearly to the base into 5 narrow persistent segments (often called sepals), of these one is often longer and sometimes much broader than the others. *Corolla* 5 to 1 in long, tubular-campanulate, rather narrow, limb of 5 short rounded segments (often colorate). *Stamens* 4 didynamous, fertile, filaments sparsely hairy, and with gland-tipped hairs near the top, anthers of 2 ellipsoid cells, ultimately divaricate. *Pollen* globose, with three longitudinal bands not reaching the poles, 25 to 30  $\mu$  in diam. *Ovary* oblong, surrounded at base by a disk, glabrous or rarely with minute scattered hairs. *Style* long, sometimes with a few hairs in the lower part. *Branches* 2, unequal. *Capsule* oblong 2 to 25 in long, ovoid at base, acute at top, glabrous or sometimes slightly minutely hairy, 2 celled, separating loculicidally into 2 valves, bearing seeds from the base. *Seeds* 12 to 20 in each capsule, in vertical rows on the edges of the carpellary leaves. *Seeds* attached on very small papillae, not on retinacula, short ellipsoid, 400  $\mu$  long, yellow brown ultimately black, smooth, more or less reticulate, minutely pitted.—**DISTRIB** Species 40 in South East Asia, 10 in Brazil.

Some of the Brazil species have flowers and capsules considerably larger than in the Asiatic species. The Asiatic species are so uniform in the corolla, stamens, and pistil—even down to the hairs thereon—that these are not described for the subjoined Malay species, which are separated mainly by characters of the bracts and calyx. The posticous stigmatic lobe (both in the type species *S. argentea*, and in some others) is occasionally somewhat 2 lobed.

**Calyx** 3 to 7 in long —

Sepals awned or with a stiff mucro —

Fruit spikes 1 to 2 in long —

Spike in fruit ovoid, leaves 2.5 in long .

.. 1 *S. setigera*

Spike in fruit oblong, leaves up to 4 to 5 in long

.. 2 *S. lanceolata*

Fruit spikes 2 to 3.5 in long —

Awn of sepals with long several celled hairs .

.. 3 *S. malaccensis*

Awn of sepals hardly microscopically scabrid

4 *S. angustifolia*

Fruit spikes 4 to 10 in long —

Awn of sepals hardly microscopically hairy.

5 *S. Kingiana*

Awn of sepals with short spreading hairs .

6 *S. longifolia*

Sepals acute, hardly awned —		
Leaves at tip acute or subacute —		
Spikes in fruit rather dense often recurved .	7	<i>S. comosa</i>
Inflorescence of one poor terminal panicle ..	8	<i>S. pauper</i>
Spikes in fruit long, very lax, panicked —		
Bracts and calyx with short hairs	9	<i>S. elongata</i>
Bracts and calyx viscidous, with gland tipped hairs ..	10	<i>S. lasiobotrys</i>
Leaves at tip rounded, bracts elliptic, obtuse	11	<i>S. Griffithiana</i>
Sepals with linear obtuse tip —		
Leaves elliptic obtuse, sepals hairy	12	<i>S. arcuata</i>
Leaves lanceolate-acute, sepals glabrous ..	13	<i>S. subglabra</i>
Calyx 125 to 175 in long —		
Corolla 6 in long —		
Leaves with triangular obtuse tip upper surface pubescent	14	<i>S. merquensis</i>
Leaves lanceolate acuminate, upper surface glabrate .	15	<i>S. racemosa</i>
Corolla 1 in long .	16	<i>S. macrantha</i>
Corolla 75 in long, leaves serrulate	17	<i>S. serrulata</i>

1 STAUROGYNE SETIGERA, O Kuntze Revisio I 497 (1891) A weak herb, 4 to 12 in long, often branched or decumbent Stem pubescent, usually rusty upwards Leaves 25 by 75 to 1 in tip triangular, base ovate or cuneate, mature nearly glabrous on both surfaces petiole 25 to 5 in long Inflorescence of one terminal sessile head (a second on a short axillary peduncle sometimes added), ovoid, dense 5 to 6 in in diam, in fruit lengthening out to 1 in, rarely to 15 in Sepals linear, very slightly unequal, the longest one 4 in long, linear, scarcely linear lanceolate, its awn with many patent short hairs, and also long several-celled scattered hairs, but no gland headed hairs Corolla 6 in long, from purple pink to pink-white, nearly glabrous without in the bud Ovary glabrous, style bare with a few hairs Capsule 2 in long Eburnaria setigera, Nees in DC Prodr XI 76 T Anders in Journ Linn Soc IX 451 (1867) C B Clarke in Hook f Fl Br Ind IV 398, Ridley in Trans Linn Soc ser 2, III 332 (1893), and in Journ As Soc Straits 121 (Singapore 1900) *E. trichocephala*, Miq Fl Ind Bat II 774 *E. subcapitata*, C B Clarke in Bot Tidskr XXIV 348 (Kjobenhaven 1902) *Adenosma uliginosa* var  $\beta$  *erecta*, Nees in DC Prodr XI 70, Miq Fl Ind Bat II 771 partly (not of R Br)

MALACCA Cumung 2355 PERAK Scortechini, Wray 1878, Larut Perak, 500 to 800 ft, Kina's Collector 2192 GOPING King's Collector 1132 PAHANG Ridley 2178 (partly) SELANGOR Curtis 2363, Kota Glanggi, fide Ridley —DISTRIBUTION Common in Sumatra, also in Java, Borneo, Siam

The dried specimens of this species are dusky green, often obscurely red brown at top, the leaves sometimes whitened beneath Kurz, in Journ As Soc Beng II

78 (1870) united the three species, *S. setigera*, *S. argentea*, and *S. lanceolata*, they are undoubtedly very closely allied

2 STAUROGYNE LANCEOLATA, O Kuntze Revisio I 497 (1891)  
 Stem 6 to 14 in high, erect, woody, undivided Leaves 4 to 5 by 6 to 1 in (or smaller), lanceolate or generally narrow-lanceolate, nearly glabrate on both surfaces Inflorescence 1 in long, in fruit 1.5 to 2 in long, less dense than that of *E. setigera*, Nees Bracts, prophylla, and calyx as of *E. setigera*, the longest sepal a trifle broader, linear lanceolate at base Corolla hairy without in the bud Adenoma lanceolatum, Blume Bijdr 756 Ebermaera lanceolata, Hassk Cat Hort Bogor 147, Nees in DC Prodr XI 76, Miq Fl Ind Bat II 774 (not of C B Clarke in Hook f Fl Br Ind IV 397) *E. longifolia*, Ridley in Trans Linn Soc ser 2, Bot III 332 (1893)

PAHANG Rukly 2177, 2178 (partly) MALACCA Derry 23 —  
 DISTRIB Java (Zollinger 591)

3 STAUROGYNE MALACCENSIS C B Clarke Herbaceous, 4 to 8 in high, often branched Stem hairy, often rusty at top, carrying 1 to 4 sometimes 8 spikes Leaves up to 4 by 1 in, elliptic lanceolate base cuneate mature with nearly glabrate surfaces petiole 5 to 1 in long Heads 1 to 1.5 in long, dense, in fruit lengthening to 2 to 3.5 in lax sometimes interrupted at base Bracts oblong or elliptic oblong, conspicuous, somewhat persistent Sepals 4 in long, conspicuously unequal the larger one lanceolate or elliptic lanceolate acuminate broadly awned, the other 4 nearly linear, tips of all the sepals with many short patent hairs and scattered, long, several-celled hairs Corolla 6 in long, nearly glabrous without Ovary with scattered minute gland tipped hairs in the upper half, which remain till the seeds are quite ripe Ebermaera argentea, Nees in DC Prodr XI 76 (partly) T Anders in Journ Linn Soc IX 451 (1867) *E. lanceolata*, C B Clarke in Hook f Fl Br Ind IV 397 (exclud syn) (not of Nees) *E. Staurogyne*, T Anders MS in hb Calcutta (not of Nees)

KIDAH and KASOOM Curtis PENANG Curtis 1931 MALACCA Griffith 189, Ridley 1636 PROVINCE WELLESLEY Ridley 6198 —  
 DISTRIB Java Tenasserim

The type *Staurogyne argentea*, Wall Pl As Rar II 80 t 186 (1831), is the common Khasia species, remote from the present, but (as Wallich says) very near *S. angustifolia*, Wallich *Staurogyne argentea* O Kuntze (and of Lindau), includes probably *S. argentea* and *S. angustifolia* but not *S. malaccensis*

4 STAUROGYNE ANGUSTIFOLIA, Wall Pl As Rar II 81 (1831)  
 Stem 8 to 12 in long, suberect, little divided, hairy, almost woody at

the base *Leaves* glabrate on the surface blade 3 to 4 by 7 to 1 in, lanceolate, mostly narrowly lanceolate (but see the var below), base attenuate, tip triangular, subacute, petiole 1 to 2 in long *Spikes* terminal and on short axillary peduncles, in flower ovoid or ellipsoid, dense, in fruit often 2 to 3 in long *Bract* narrow oblong, aristate, with long hairs in the lower part *Calyx* unequal, the largest sepal 6 in long, the base narrow lanceolate, with long hairs the awn long, somewhat rigid, glabrous or with minute bristles (less than 40  $\mu$  long) the other 4 sepals nearly linear *Corolla* 6 in long, hairy without *Capsule* 2 in long thicker than in the neighbouring species *S. argentea* O Kuntze Revisio I 497 part m (1891) (not of Wall) *Ebermareria angustifolia*, T Anders in Journ Linn Soc IX 451 (1867) C B Clarke in Hook f Fl Br Ind IV 398 Puan Bong Plants 798 *I. Staurogyne*  $\beta$  *angustifolia* Nees in DC Prodr XI 75

PERAK *Ridley* 9766 *Curtis* MALACCA *Goodenough* 1689 —  
DISTRIB *Meigui* (*Falconer* 860), *Tavoy* (*Wallich* 4906)

I Anderson has written *I. angustifolia* on *Falconer* 860 but his name *angustifolia* (as well as *Wallich* 4906) may include other nearly allied forms. The true *I. Staurogyne* Nees is a Khasia species in which the bract and sepals have no long several celled hairs. This plant is put with *S. longifolia* not with *I. Staurogyne*, by collectors. The leaves in all the examples seen have dried brown red.

5 STAUROGYNE KINGIANA C B Clarke n sp. *Stems* 2 to 3 ft high pubescent *Leaves* glabrous blade up to 8½ by 2 to 3 in elliptic narrowed at either end main nerves 12 to 15 pair petiole 1 to 2 in long *Spikes* 3 to 6 on a stem terminal and on short axillary peduncles 4 to 10 in long undivided dense ovon in fruit *Bract* linear 8 in long *Sepals* 5 nearly equal linear longest up to 75 in long very little dilated at the base, sparsely hairy at base glabrous or minutely scabrous in the upper half *Corolla* 1 in long, yellowish white lower lip pale red (collector's note) glabrous without *Stamens* and pollen of the genus *Pistil* glabrate *Capsule* 2 in long rather thick the endocarp much thickened almost corky Allied to *S. angustifolia* T Anders.

PERAK on limestone hills, 500 to 800 ft alt, *Kings Collector* 10704 *Goenong Panti*, *Kings Collector* 208 PAHANG *Ridley* 2176

6 STAUROGYNE LONGIFOLIA, O Kuntze Revisio I 497 (1891) Suberect, 8 to 30 in high, hairy *Stem* (in large examples) woody robust below, and with erect branches *Leaves* glabrous on the upper surface, blade 5 by 1 in, lanceolate, attenuate at either end (in the type example, but the leaves are frequently longer, and there are examples with shorter, broader leaves) petiole 1 to 15 in long *Spikes* short peduncled at the end of branches and in the axils short oblong (often nodding) when

young, in fruit 2 to 5 in long, somewhat dense, erect *Bract* and *calyx* softly hairy, without long, fine, several-celled hairs, bract narrow-lanceolate, aristate, 6 in long, sepals all linear, the longest one 5 in long, including its awn 16 in long, the awn hairy to the tip with spreading hairs varying in length, but all short *Corolla* long, hairy without, tube nearly white, segments and mouth pink to purple *Pistil* glabrate *Stamens* and pollen of the genus *Capsule* 2 in long Lindau in Engl & Prantl Pflanzenfam IV 3B, 288 *Ebermaiera longifolia*, Nees in DC Prodr XI 76, T Anders in Journ Linn Soc IX. 451 (1867), C B Clarke in Hook f Fl Br Ind IV 399, Ridley in Trans Linn Soc ser 2, III 332 (1893)

MALACCA *Cuming* 2350, *Lemann*, *Griffith* (K D) 6079, *Hullett* 403 PERAK *Scottichini* 155, *Wray* 1302, *Ridley* 1604, alt 300 to 800 ft, *King's Collector* 5821, 8678 SELANGOR *Ridley* 7590 N. GRI SEMBILAN *Ridley* 10098 PAHANG Tahan, fide *Ridley*

This species is very close both to *S. angustifolia* and to *S. comosa*, the former differs by having the awns of the sepals glabrous or microscopically scabrous, the latter differs in that the sepals have lanceolate linear soft tips, hardly awns

7 STAUROGYNE COMOSA, O Kuntze Revisio I 497 (1891) *Stem* 1 to 3 ft high almost woody below, hairy *Leaves* blade up to 8 by 3 to 3.5 in, cuneate at either end upper surface glabrous obscurely minute granular tuberculate petiole 1 to 2.5 in *Spikes* short, penduncled, undivided, dense, in flower 1 to 4 in long nodding, in fruit up to 5 to 7.5 in long, often deflexed rather dense (scarcely interrupted at base), softly hairy *Bract* and *sepals* softly hairy with long several-celled hairs, bract 4 in long in Wallich's type (often longer), lanceolate acuminate, point linear (hardly awned), with soft white hairs, sepals 3 in long in Wallich's type (often longer), the longest (wider than the others) lanceolate with a linear soft hairy tip *Corolla* in the bud densely clothed with deflexed hairs without *Pistil* glabrous *Stamens* and pollen of the genus *Capsule* 2 in long Lindau in Engl & Prantl Pflanzenfam IV 3B, 288 *Ruellia* ? *comosa*, Wall Cat 2414 *Ebermaiera axillaris*, Nees in Wall Pl As Bat III 80, and in DC Prodr XI 75, T Anders in Journ Linn Soc IX 452 (1867), C B Clarke in Hook f Fl Br Ind IV 399

PERANG *Wallich* 2414 PERAK *Scottichini* 777, *Wray* 2192, *Ridley* 2893, 500 to 800 ft, *King's Collector* 10705, Larut, 100 ft, *King's Collector* 1834 SELANGOR (*Ridley*) 7589, 8543, 10546

*King's Collector* notes the calyx "velvety claret coloured," the corolla blue white, darker inside. The corolla seems caducous as the large well collected material provides buds and fruit only. The type examples of Wallich from Penang

are unusually small specimens. This species is generally distinguishable from *E. longifolia*, Nees, by its much broader (elliptic) leaves.

8 STAUROGYNE PAUPPER, C. B. Clarke, n. sp. Stem 18 in long, undivided, glabrate, decumbent, woody at base. Leaves glabrate, with few scattered, white, adpressed bristles on the upper surface, blade 4.5 by 2 in long, elliptic lanceolate, acuminate, acute, base cuneate, petiole 2.5 to 5 in long. Inflorescence of one terminal poor panicle, 3 by 1½ in, with few distant flowers, bracts 5 in long, linear, soft, not awned. Sepals subequal, 5 in long, linear, with soft hairs and many gland-tipped hairs. Corolla 6 in long, pubescent without, "pale yellow with dark stripes" (King's Collector). Pistil of *Staurogyne*, glabrous except a few small hairs in the lower part of the style.

PERAK alt 200 ft, King's Collector 2832

9 STAUROGYNE ELONGATA, O. Kuntze Revisio I 497 (1891). Slightly hairy. Leaves glabrate, blade 6 by 2 in, oblong-elliptic, cuneate at either end, nerves 8 to 10 pair, thin, petiole 2 to 3 in long. Spikes up to 4 to 7 by 1 in, panicle, lax, pedicels often 1.75 in long, with alternate prophylla. Bracts nearly 5 in long, lanceolate linear, with short white hairs, no gland-tipped hairs. Sepals 5, linear, the longest nearly 5 in long, slightly widened at base. Corolla (buds) 4 in long, scarcely pubescent without. Capsule 2 in long, the upper half with scattered minute hairs. Lindau in Engl. & Prantl Pflanzenfam. IV 38, 288. *Adenosma elongatum*, Blume Bijdr. 757. *Erythraeanthus elongatus*, Nees in DC Prodr. XI 78, var.  $\beta$  excl. *Ebermaura elongata*, Nees in DC Prodr. XI 721, var.  $\beta$  excl. T. Anders in Journ. Linn. Soc. IX 452 (1867), C. B. Clarke in Hook. f. Fl. Br. Ind. IV 400 (not of Miquel).

PENANG Wallich (fide T. Anderson). — DISTRIBUTION Java.

The var.  $\beta$  of Miquel (here excluded) is *Ebermaura debilis*, T. Anders (in Journ. Linn. Soc. IX 452, in note (1867)), a weak Philippine species. *E. elongata*, Miquel (Fl. Ind. Bat. II 775), was (so Miquel says) — *E. Griffithiana*, T. Anders, and, from Miquel's description, it must have been largely (or wholly) that species. As to *E. subpaniculata* Hassk. (Retzia I 77 (1855)), there are now here examples both of the Salak wild plant and of that cultivated at Buitenzorg; they may be varieties of *E. elongata*, Nees, but do not match it. The above description of *E. elongata*, Nees, is wholly from the Java type plant, no example from Penang has been seen.

10 STAUROGYNE LASIOBOTRYS, O. Kuntze Revisio I 497 (1891). Stem 18 to 20 in, suberect, hairy. Leaves glabrate, blade 5 by 1.5 in, oblong or elliptic lanceolate, cuneate at either end, thin, petiole 1 to 3 in long. Spikes up to 4 to 6 by 1 in, panicle, lax, softly viscous-hairy, pedicels often 1.6 in long. Bracts 3.5 in long, linear, with several-celled hairs ended by a coloured gland. Sepals 5, linear, the longest 3.5 in.

long, with several-celled gland-tipped hairs *Corolla*, *stamens*, *capsule* as of *S elongata* *Ebermaiera lasiobotrys*, Nees in DC Prodr XI 721, Wall Cat 9084, T Anders in Journ Linn Soc IX 452 (1867), C B Clarke in Hook f Fl Br Ind IV 400

PERAK *Curtis* 1350, *King's Collector* 8370 ("Flower dark-red tipped with pink"), Larút, 500 to 1000 ft, *King's Collector* 2292 SELANGOR *Ridley* 7588 —DISTRIB Moulmein, Mergui, Tavoy

11 STAUROGYNE GRIFFITHIANA, O Kuntze Revisio I 497 (1891) *Stem* 4 to 8 in long, creeping at base *Leaves* (mature) shortly rather dense hairy on the upper face, blade 5.5 by 3 in in Griffith's type (often smaller), roundly elliptic, very obtuse, base rounded or cordate (but cuneate in many examples), petiole 5 to 2 in long *Inflorescence* simple or branched, main spike 6 in long in Griffith's type, lax, only slightly hairy *Bracts* up to 5 in long, elliptic, rounded, obtuse at top *Sepals* 5, the longest 4 in long, linear, tip linear-acute, not awned, with sparse short several celled hairs not gland tipped (In the Perak example the sepals are linear ligulate obtuse at the tip) *Corolla* 6 in long, white, rarely tinged pink *Capsule* 2 in long *Erythracanthus Griffithianus*, Nees in DC Prodr XI 78 *E obtusus*, Wight Ic t 1491 (not of Nees) *Ebermaiera Griffithiana*, T Anders in Journ Linn Soc IX 452 (1867), C B Clarke in Hook f Fl Br Ind IV 400, Ridley in Trans Linn Soc ser 2, III 332 (1893), and in Journ As Soc Straits 121 (Singapore 1900) *E elongata*, Miq Fl Ind Bat II 775 (mainly)

MALACCA *Griffith* (K D) 6078, *Goodenough* 1509 SINGAPORE *Ridley* *Hullett* 613, *G King* PAHANG *Ridley* 2175 PERAK alt 600 to 1000 ft, *Scortechini* 40, *King's Collector* 10335 PAHANG at Tahan, *vide Ridley*

12 STAUROGYNE ARCUATA, C B Clarke, n sp *Stem* 4 to 8 in long, villous, woody, creeping *Leaves* with scattered hairs above or glabrate, blade 4.5 by 2.5 in, ovate elliptic, tip triangular obtuse, base cuneate or sometimes rounded petiole 5 to 1.5 in long *Spikes* often 2 or 3, lax, 2 to 4 in long, arcuate in fruit, bracts linear or sub lanceolate, .5 in long, hairy *Sepals* subequal, 5 in long, linear or very narrow ligulate, hairy, tip subobtuse *Corolla* 6 in long, pubescent without, red (Wray) *Capsule* 2 in long

PERAK *Scortechini* 456, 728, *Wray* 48, 694, *Ridley* 2892

13 STAUROGYNE SUBGLABRA, C B Clarke, n sp Nearly glabrous *Stem* 6 to 12 in *Leaves* glabrous, the upper surface sometimes obscurely puberulous, blade 4.5 by 1 to 1.25 in, lanceolate or broad lanceolate, subacute, base cuneate, petiole 5 to 1 in long *Spikes* often 2 to 4, very loose, up to 3 to 5 in long, the rachis microscopically scabrous,

bracts 5 in. long, linear, or the lower ones oblong *Sepals* subequal, 5 in long, linear, or scarcely oblong-linear, subobtusely, glabrous, almost shining *Corolla* 6 in long, very white (King's Collector) *Capsule* 2 in long

PERAK *Scortechini* 5386, 406, *Ridley* 5514, *Curtis*, alt 3500 to 4000 ft, *King's Collector* 8427

This species is very similar to *F. arcuata* in all essential points, the two characters of hairy sepals with elliptic obtuse leaves, and glabrous sepals with lanceolate leaves, are, however, concomitant throughout the ample material

14 STAUROGYNE MERGUENSIS, O Kuntze Revisio I 497 (1891) *Stem* 4 to 8 in long, creeping at base, pubescent *Leaves* minutely pubescent on the upper surface, blade up to 5 by 2.5 in (much smaller in Helfer's type), tip obtusely triangular, base nearly always cordate *Petiole* 5 to 1.5 in long *Spikes* usually peduncled, often paniculate, 2 to 3 in long, very lax, thin *Bracts* scarcely 2.5 in long, linear lanceolate or linear *Sepals* 5, subequal, united at the base, 1.25 to 1.75 in long, linear, hispid *Corolla* 6 in long, light blue or violet and white, pubescent without *Capsule* 2.5 in long *Ebermaiera miquensis* T Anders in Journ Linn Soc IX 452 (1867), C B Clarke in Hook f Fl Br Ind IV 402

PERAK *Wray* 3966, *Scortechini* 285, 1356, alt 400 to 600 ft *King's Collector* 8284, *Wray* 4108 TRANG *Goldham* KLDH *Curtis*  
DISTRIB Mergu

This species in habit much resembles *I. incana*, and there is little to separate it except the small bracts, the hairs on the upper surface of the mature leaves are similar but smaller

15 STAUROGYNE RACEMOSA, O Kuntze Revisio I 497 (1891) *Stem* 1 to 2 ft high, pubescent, creeping at base *Leaves* glabrate, usually drying a red brown blade 4 by 1.25 in, broadly lanceolate, acuminate at either end, *Petiole* 5 to 1.5 in long *Spikes* usually peduncled, simple or panicled, pubescent, up to 3 to 5 in long, very lax pedicels distant, exceedingly short, bracts lanceolate, hairy, 1.75 in long *Calyx* of 5 equal lanceolate lobes, 1.75 in long *Corolla* 6 in long, white, tipped rose or purplish, pubescent without *Capsule* 2 in long, broad oblong T Anders in Journ Linn Soc IX 452 (1867), C B Clarke in Hook f Fl Br Ind IV 401, Lindau in Engl & Prantl Pflanzenfam IV 31, 288 *Ruellia racemosa*, Roxb Fl Ind III 42 *Ebermaiera racemosa*, Miq Fl Ind Bat II 775 *Erythraeanthus racemosus*, Nees in Wall Pl As Rar III 80, and in DC Prodr XI 78

PERANG *Wallich* 2336, *Stoliczka*, *Deschamps*, *Hullett* 124, *Maringay* (K D) 1173 alt 2000 ft, *King's Collector*, *Curtis* 406 MALACCA



*Griffith* SINGAPORE *Walker* 197 *INDRAGERI* *Curtis*. — *DISTRIB.*  
Moulmein

16 *STAUROGYNE MACRANTHA*, C B Clarke, n sp *Stem* 3 to 4 ft long, villous *Leaves* glabrous, with a very few remote hairs on the upper surface, blade 4.5 by 1.75 in., elliptic-lanceolate, subacute, base cuneate, petiole .25 to 1 in long, villous *Peduncles* two, penultimate, 3 in long, villous, carrying small few-flowered panicles, bracts 2 in. long, linear, very hairy *Sepals* subequal, 1.75 in long, linear, very hairy *Corolla* 1 in long, pubescent without

*PFRANK* at Larút, alt 4500 to 5000 ft, *King's Collector* 2417

17 *STAUROGYNE SERRULATA*, C B Clarke, n sp *Stem* elongate, villous upwards *Leaves* 4 to 5 by 1.75 in., elliptic, acuminate at either end, margin closely serrulate, both surfaces slightly pubescent, petiole .5 to 1 in long, villous *Peduncles* 4, from the penultimate axils, 4 in long, villous, inflorescence 12 to 18-flowered, lax, pubescent, bracts hardly 1.25 in long, linear *Calyx* 1.25 in long *Corolla* .75 in long, white, nearly straight, but the pedicels bent close under the calyx, so as to bring the corollas horizontal

*PLERAK* Ulu Batang Padang, *Wray* 1599, *Scortechini*

#### 4 *CARDANTHERA*, Voigt

*Herbs* *Leaves* opposite, upper toothed, rarely entire, lower frequently pinnatifid *Flowers* in axillary clusters (in non Malayan species running into terminal inflorescences), bracts and prophylls often obscure or 0 *Sepals* narrow, often unequal *Corolla* nearly straight, tube shorter than the calyx, limb 2 lipped, lobes contorted in the bud *Stamens* 4, fertile, anther cells oblong, pollen globose, small with numerous stria converging to the poles *Capsule* sessile, narrow, seed bearing from the base *Seeds* 30 to 100, on small, straight, conic, soft funicles, hardly to be called retinacula (i.e. curved, rigid, pointed), glabrous or slightly glandular, i.e. not clothed with hygroscopic hairs

*DISTRIB.* Species about 8 in India, 2 in Africa

This genus should, according to Slater, be placed in the same Subfamily with *Staurogyne*, the pollen being identical in the two genera

*CARDANTHERA TRIFLORA*, Voigt Hort Sub Calc 482 (1845) Pubescent, decumbent *Branches* up to 1 ft long *Leaves* ovate, crenate-serrate, the lower (when in water) often pinnatifid *Flowers* 1 to 3 in the axils, bracts 3 to 3.5 in long, obovate, prophylls .25 in long, oblong *Sepals* linear, unequal, about as long as the bract *Corolla* .35 to .5 in long, purple and white *Capsule* .25 to .35 in., pubescent, style thinly hairy C B Clarke in Hook f Fl Br Ind IV 405 *Ruellia triflora*,

Roxb Hort Beng 46, and Fl Ind III 52 *Adenosma triflora*, Nees in Wall Pl As Rar III 79, and in DC Prodr XI 68, T Andois in Journ Linn Soc IX 454 (1867)

SINGAPORE *vide* C B Clarke (in Hook f l c) — DISTRIB Abundant in Bengal, extending to Pegu

I do not find now in the Kew Herbarium any example of this from Singapore it is nearly sure to grow in the Malay Peninsula

## 5 HYGROPHILA R Br

Herbs, attaining 1 to 5 ft high, more or less hairy. Stems quadrangular. Leaves opposite, equal, entire or crenate the upper surface full of raphides. Flowers in continuous spikes or axillary clusters. Calyx 25 to 5 in long, with 5 acute teeth, the lower half tubular in the bud, often with 5 lines of very thin tissue, and split deeply in the fruit or 4 fid in *H spinosa*. Corolla distinctly 2 lipped lower lip trifid, the middle segment broader, emarginate. Stamens 4, didynamous subsimilar, fertile (except in *H polysperma*, where the two lower are filaments only or nearly obsolete) filaments glabrous or nearly so, anthers of two parallel subequal muticous cells, pollen globose, 15 to 35  $\mu$  in diam, with 12 to 18 longitudinal ribs. Ovary oblong, with 8 to 80 ovules upper part of ovary and style more or less hairy style with one linear branch, the other reduced to a small rudiment. Capsule 25 to 5 in long, linear oblong, seed bearing from the base seeds 8 to 80 ovoid, flat, 50  $\mu$  in diam, brown, nearly smooth on faces shaggy, with hygroscopic hairs on margin — DISTRIB Species 10, in the warmer parts of the globe these fall into three well marked subgenera, the species of each of which are so closely allied as to be esteemed subspecies only by some competent botanists.

Subgenus 1 *HEMIADPHINE* (genus), Nees Unarmed 1 flower in terminal spikes —

Fertile stamens 2

Bracts oblong or elliptic, as long as the calyx

1 *H polysperma*

Subgenus 2 *LUHYGROPHILA* Unarmed 1 flower in distant axillary clusters —

Leaves lanceolate acute or linear —

Flowers in dense axillary clusters

2 *H angustifolia*

Axillary clusters small, often 3 to 1 flowered

3 *H saratilis*

Leaves obovate or oblong, triangular or obtuse at tip —

Leaves oblong, all sessile or nearly so

7 *H subacutis*

Leaves, or at least lower leaves, petioled —

Corolla 25 to 35 in long

.. 5 *H mesanthos*

Corolla 5 to 8 in long —

Capsule 75 to 8 in long Calyx sparingly hispid .. 4 *H quadrivalvis*

Capsule 7 in long Calyx densely hispid .. 6 *H phlomoides*

Subgenus 3 *ANIERACANTHA* (genus), Nees Each whorl of axillary flowers with some strong spines, often an inch long, round it —

Leaves sessile Corolla 1 in long .. .. 8 *H spinosa*

1 *HYGROPHILA POLYSERMA*, T Anders in Journ Linn Soc IX 456 (1867) Small, procumbent, divided, sparingly pubescent *Leaves* 1 by 5 in, oblong or elliptic, nearly entire, base narrowed or shortly petioled, upper surface full of raphides *Spikes* terminal, 1 to 25 in long, rather dense bracts 25 to 35 in, elliptic, prophylla 25 in, lanceolate *Calyx* 25 in, divided nearly to the base segments 5, linear, pubescent *Corolla* 35 in long, slender, pubescent, pale blue or white *Stamens* 2 the two posticous filaments without anthers, sometimes nearly obsolete anther-cells 2, oblong pollen 25  $\mu$  in diam, globose, with 12 to 16 longitudinal ribs *Ovary* hairy towards the top, style hairy, stigma of one linear and one suppressed branch *Capsule* 25 to 35 in long, oblong, hairy towards the top *Seeds* 20 to 32, orbicular, 40 to 50  $\mu$  in diam, flattened, brown, shaggy on the margin with hygroscopic hairs Boiss Fl Orient IV 519, C B Clarke in Hook f Fl Br Ind IV 406, Lindau in Engl & Prantl Pflanzenfam IV 3 n, 297 Prain Beng Plants 801 *Justicia polysperma* Roxb Hort Beng 3, and Fl Ind I 119 *Hamadelphis polysperma*, Nees in Wall Pl As Rar III 80, and in DC Prodr XI 80 Wight *fl* t 164 n, fig 3, and Ic t 1492 Griff Notul IV 135, Miq Fl Ind Bat II 776

MALACCA *Griffith* —DISTRIB Common throughout India Kabul Tonkin

2 *HYGROPHILA ANGUSTIFOLIA*, R Brown Prodr 479 (1810) *Stems* 2 ft high, often decumbent at base *Leaves* 3 by 7 in, lanceolate, attenuate at either end, subentire, glabrate upper surface with many raphides petiole 25 in, sometimes 5 in long *Flowers* in distant axillary dense clusters, bract 25 to 35 in long, elliptic, prophylla scarcely 25 in long *Calyx* 35 to 5 in long, lobes in flower hardly half as long as the tube, triangular linear, densely clothed with conspicuous raphides, sparsely hispid or nearly glabrous *Corolla* 5 to 7 in long, pale purple *Stamens* 4, fertile, anther cells 2, oblong, muticous, at equal height filaments glabrous, pollen 25  $\mu$  in diam, globose, with 12 to 16 longitudinal ribs *Style* hairy, stigma of the genus *Capsule* 5 to 7 in long, a little exceeding the calyx, 20- to 28 seeded Nees in DC Prodr XI 91, Benth Fl Austral V 545, Ridley in Trans Linn Soc ser 2, III 333 (1893) *H salicifolia*, Nees in Wall Pl As Rar III 81, and in DC Prodr XI 92, Wight

Oct 1490, C B Clarke in Hook f Fl Br Ind IV 407, Hemsl in Journ Linn Soc XXVI 237 (1890), Lindau in Engl & Prantl Pflanzenfam IV 3 B, 297 Ridley in Journ As Soc Straits 121 (Singapore 1900), Prain Beng Plants 801 *H. lancea*, Miq in Ann Mus Bot Lugd Bat II 123 (1865-66) *Ruellia salicifolia*, Vahl Symb III 84 Roxb Fl Ind III 50

SELANGOR *Curtis* 2365 PAHANG *Ridley* 1213 PERAK and KELANTAN *vide Ridley* —DISTRIB From South India to China and Japan

The description above is taken from Wall Cat 2373, which is Nees "type" of *Hygrophila salicifolia*. The Selangor example differs from this in having the capsules 8 in long in which point it resembles *H. quadrivalvis*, Nees below. T Anderson esteemed the whole of the species in the present section to constitute but one polymorphic species (Journ Linn Soc IX 456 (1867)). They are described here shortly only, with reference to their differences from *H. salicifolia*, Nees, taken as the standard form.

3 *HYGROPHILA SAXATILIS*, Ridley in Trans Linn Soc ser 2, III 333 (1893). Small, rigid, branched, 6 to 14 in high. Leaves approximate, 1 to 1.5 by .175 to .2 in, linear, entire, nearly glabrous. Flowers in small axillary clusters, usually only 3 to 1 together. Corolla .35 to .5 in long hardly smaller than that of *H. salicifolia*, white without violet within. *H. pusilla*, Blume Bijdr 804.

PAHANG *Ridley* 2179 PERAK *Scortechini*, alt 300 ft Wray 3319, 3489, *Curtis* —DISTRIB Ceylon (Thwaites 3109), Borneo Philippines

4 *HYGROPHILA QUADRIVALVIS*, Nees in Wall Pl As Rai III 80 (1832). Stems stout, often 3 to 4 ft long. Leaves with an obovate triangular or obtuse tip obovate rather than lanceolate, often crenulated in the upper half. Calyx exactly as of *H. salicifolia*. Corolla 7 to 8 in long. Capsule 7.5 to 8 in long, often numerous in the whorl, very erect. Nees in DC Prodr XI 89, C B Clarke in Hook f Fl Br Ind IV 408, Ridley in Journ As Soc Straits 121 (Singapore 1900), Prain Beng Plants 801, 802 *H. obovata*, Wight Oct 1489.

PENANG *Deschamps*, *Curtis* 1757, Durian S B, King's Collector 368 (flowers white). MALACCA *Griffith*, *Mangay* 1979 (Kew 1178). SINGAPORE *Lobb* 57, *Kurz*, *Hullett* 231 PERAK *Scortechini* 64, 84, in salt swamps Wray 2506, Mekong, *Scortechini* 1099 Durian S B, King's Collector 364. DISTRIB India, common, especially near the sea, Java, Borneo, Tonkin.

5 *HYGROPHILA MEIANTHOS*, C B Clarke, n sp. Leaves obovate, 2 in long, nearly glabrous. Bract less than .25 in long, oblong. Calyx

25 in long, divided half-way down, teeth sparsely white-hispid  
*Corolla* (expanded) 25 to 35 in long *Anthers* small, round *Capsule*  
 scarcely 35 in long *H salicifolia* var *assurgens* C B Clarke in  
 Hook f Fl Br Ind IV 407 (*partly*)

MALACCA *Murray* 3002 (K D 1177)

The examples are good with numerous flowers and ripe fruits, and appear  
 "normal" in all respects

6 *HYGROPHILA PHLOMOIDES*, Nees in Wall Pl As Rar III 80  
 (1832). *Stems* often very hairy *Leaves* 2 to 4 in long, obovate, tip  
 triangular, rarely subacute *Calyx* divided half-way down, teeth  
 densely white hispid, so that the whorls resemble somewhat those of  
*Phlomis*, otherwise as *H quadrivalvis* Miq Fl Ind Bat II 779  
*H phlomoides*, Nees in DC Prodr XI 90, C B Clarke in Hook f  
 Fl Br Ind IV 408, Prain Beng Plants 801, 802 *H hirsuta*, Roxb  
 Fl Ind III 51 *H phlomoides*, Wall Cat 2376 — Rheede Hort  
 Mal II 89, t 46

PENANG *Deschamps* SINGAPORE *Ridley* 3612A SELANGOR  
*Ridley* 8547, 10499 PERAK *Scortechini* 620, 1106, alt 200 ft  
*Wray* 1748, 2432 — DISTRIB India (common), Tonkin, Borneo

VAR  $\beta$  *Roxburghii*, C B Clarke in Hook f Fl Br Ind IV  
 408 Smaller, often procumbent and more divided *Leaves* 1 to  
 2 in long, often scabrid, pubescent Prain Beng Plants 801, 802  
*H obovata*, Griff Notul IV 134 (*not exactly that of Nees*) *Ruellia*  
*obovata*, Roxb Fl Ind III 51

PENANG *Deschamps* — DISTRIB Chittagong, Pegu, Mergui,  
 Philippines

I do not see how this var differs from *H radicans* Nees in Wall Pl As Rar  
 III 81, and in DC Prodr XI 92

7 *HYGROPHILA SUBSESILIIS*, C B Clarke, n sp *Stem, leaves* and  
*inflorescence* with brown hairs *Leaves* 1.5 by .4 in, oblong, obscurely  
 obovate, tip triangular, base narrowed, nerves beneath conspicuous,  
 petiole, even in the lower leaves, 0 or hardly any, otherwise as  
*H salicifolia*

MALACCA *Harvey*

This resembles some forms of *H undulata*, Blume in which, however, the brown  
 hairs are not present, and the lower leaves are petioled

8 *HYGROPHILA SPINOSA*, T Anders in Thwaites Enum Pl Zeyl  
 225 (1864) *Stems* stout, 2 to 5 ft high *Leaves* 3 to 6 in long, lan

ceolate to linear, hispid, sessile. *Flowers* clustered in the axils, 4 to 6 of the outer bracts being strong spines an inch long. *Bract* .5 to 1 in long, lanceolate. *Calyx* .35 to .5 in. long, divided nearly to the base into 4 lanceolate lobes, one of which is broader and sometimes emarginate. *Corolla* 1 in. long, pale purple. *Anthers* and pollen of the genus. *Capsule* .35 in. long, linear-oblong, 4- to 8-seeded from the base. C. B. Clarke in Hook. f. Fl. Br. Ind IV 409, Burkill in Dyer Fl Trop. Afr. V. 31; C. B. Clarke in Dyer Fl. Cap V 11 (*with all syn*); Prain Beng Plants 802, *H. longifolia*, Kurz in Journ. As Soc Beng 1870, II 78 (*non* Nees). *Asteracantha longifolia*, Nees in Wall. Pl. As Rar III 80, and in DC Prodr XI. 247, Wight Ic t 449, Miq. Fl. Ind Bat II. 811, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 297. *A. auriculata*, Nees in DC. l. c 248

SINGAPORE *King's Collector* 249.—DISTRIB. Abundant in India and Africa

*Hygrophila longifolia*, Nees (in Mart Fl Brasil, IX. 22 (1847)), is a totally different plant, for this cause T. Anderson, when he transferred *Asteracantha longifolia* to *Hygrophila*, gave it the new name *H. spinosa*. Nevertheless, some botanists call the Asiatic *Asteracantha* by the name *H. longifolia*, thereby causing great confusion

## 6. NOMAPHILA, Blume

Inflorescence in numerous 1-sided, open, axillary racemes shorter than the leaves. *Bract* (and prophylla) inconspicuous, linear, or wanting. *Calyx* even in the bud deeply divided (two-thirds or three-fourths of the way down) into 5 lobes. Otherwise as *Hygrophila* — Species 14, viz 8 in South-east Asia, very closely allied, and 6 in Tropical Africa.

This genus is in essentials *Hygrophila*, and is sunk in *Hygrophila* by both Lindau and Burkill, but is easily distinguished from it, whether estimated a genus or a subgenus

1. *NOMAPHILA STRICTA*, Nees in DC Prodr XI 81 (1847). Nearly glabrous, drying a black-green. *Stems* 3 ft. *Leaves* blade 3 to 4.5 in long, narrowly elliptic, attenuate at either end, midrib beneath with fine patent hairs, petioles up to 2 to 3 in. long. *Corymbs* in many axils, 2 to 4 in. in diam., recurved in fruit, peduncles less than 1 in long, pedicels nearly glabrous, bract and prophylla linear, inconspicuous or 0. *Calyx* .25 to .35 in long, divided nearly to the base, segments 5, linear, glabrous or minutely scabrous or hispid (not viscid or glandular-hairy). *Corolla* .5 in long or more, bright blue. *Filaments* glabrous, pollen 20  $\mu$  in diam., globose, with 12 to 16 longitudinal ribs. *Ovary* and style pubescent. *Capsule* .35 to .6 in long,

seeds small, ovoid, flattened, brown, shaggy on the margin, with hygroscopic hairs C B Clarke in Hook f Fl Br Ind IV 409 *Justicia stricta*, Vahl Symb II 6 *Cryptophasium axillare*, Nees in DC Prodr XI 96, cf Vidal Phanerog Cuming Philipp 61 *in nota*, 132 *Hygrophila stricta*, Lindau in Engl & Prantl Pflanzenfam IV 3b, 297 (non Hassk.)

PERAK King's Collector 367, Curtis 3152, Wray 4256, *Scortechini*  
JOHORE Ridley 4173, 11133 —DISTRIB Borneo, Philippines

Nees himself, in DC Prodr XI 722, united this species to *N. corymbosa*, Blume Bijdr 804 (1825), the latter is (when dried) a smoky grey green, the pedicels and calyx have viscous (and often glandular) hairs The two are very close together

2 *NOMAPHILA MINOR*, C B Clarke, n sp. Smaller in all its parts than *N. stricta*. Leaves lamina scarcely 2 in long. Corymb-branches slender glabrate. Corolla 25 to 35 in long. Anthers and pollen smaller. Capsule 25 to 35 in long. *N. stricta* (partim), C B Clarke in Hook f Fl Br Ind IV 409 *Ruellia* ? *paniculata*, Herb Rottler

PERAK *Scortechini* 1374 —The example in Herb Rottler is without locality

## 7 *RUELLIA*, Linn

Herbs or undershrubs. Leaves opposite, subequal, entire, upper surface with rhaphidos. Flowers axillary (or panicled in American species) bract 0 prophyll spatulate or subfoliaceous. Exceeding the calyx. Calyx deeply 5 fid segments subequal linear. Corolla tubular ventricose, blue to white lobes rounded, twisted to the left in the bud. Stamens 4, didynamous filaments glabrous, anthers of 2 oblong subequal, parallel, mucous, glabrous cells pollen globose, large (30 to 50  $\mu$  in diam), honeycombed. Ovary glabrous, ovules 3 to 10 in each cell, style hairy, with one linear branch, the other obsolete. Capsule clavate base solid, sterile, top ellipsoid or subglobose, with 6 or more close packed seeds, retinacula large, hooked. Seeds ovoid, flattened, hygroscopically shaggy on margin. —Species 150 (Bentham) or 200 (Lindau), in the warmer parts of the world, more abundant in America.

But a considerable number of the species reckoned in *Ruellia* by Lindau have not "wabenpollen" (honeycombed pollen), but "stachelpollen" (prickly pollen), so that the species left in *Ruellia* may not be more than 120 to 150, and possibly may be much fewer, if (as in the above diagnosis) the genus is restricted to those plants which have a stalked clavate capsule. [*Dipteracanthus* (genus), Nees]

1 *RUELLIA REPENS*, Linn Mant 89 (1767) (not of Burm.) Sparingly hairy or glabrate. Stem 6 to 20 in., weak, often much branched

*Leaves* 1 by 35 to 5 in, lanceolate, nearly always narrowed at the base, entire, upper surface sprinkled with raphides petiole 125 to 2 in  
*Flowers* axillary, mostly solitary, bract 0 prophylla spatulate or foliaceous, exceeding the calyx *Calyx* 2 in long, divided nearly to the base into 5 subequal linear segments *Corolla* 75 in long *Capsule* 5 in long, contracted, sterile at the base, the seeds (usually 5 to 8) imbricated near the top Blume Bijdr 794, T Anders in Journ Linn Soc IX 460 (1867), C B Clarke in Hook f Fl Br Ind IV 412, Ridley in Trans Linn Soc ser 2, III 332 (1893), Lindau in Engl & Prantl Pflanzenfam IV 3B, 310, Hemsl in Journ Linn Soc XXVI 238 (1890), Ridley in Journ As Soc Straits, 121 (Singapore 1900) *Dipteracanthus lanceolatus*, Nees in Wall Pl As Rar III 82, and in DC Prodr XI 124, Miq Fl Ind Bat II 782 *D. subdenticulatus*, Miq ' Journ Bot Néerl I 117 (1861) *Rostellularia sarmentosa*, herb Buitenz ' (non Nees)

PENANG Curtis 1876 MALACCA Griffith SINGAPORE Lobb T Anderson, Hullett, Ridley 2698, 10725 KEDAH Ridley 5750 PAHANG fide Ridley PERAK Scottichini 1283 —DISTRIBUTION A common Malay plant, extending to Tenasserim on one side, to China and the Philippines on the other

The plate of Burmann (Fl Ind t 11, fig. 1) is good and represents a plant not of the genus *Ruellia* In the Addit to Mant 15 (1771) Linnæus says his *Ruellia repens* was Burmann, t 41 fig 1 it may be more correct to call this species *R. repens* Blume Nees in DC Prodr XI 370 says his *Rostellularia sarmentosa* had the capsule ' 4 seeded from the base, so that there is probably some error in the *Rostellularia sarmentosa* issued from Buitenzorg

VAR  $\beta$  *linearis*, C B Clarke *Leaves* 225 by 2 to 25 in  
 PAHANG Ridley 2182 IPOH Deschamps

*Ruellia prostrata*, Lam Encycl VI 349 (cf Hook f Fl Br Ind IV 411), differs a little from *R. repens* Linn., by having larger flowers and capsules and the leaves usually rather larger In the Kedah example Ridley n 5750 the flowers are more than 1 in long, and the capsules more than 75 in long, and Ridley has issued it as *R. prostrata*, the habit and small leaves are typical *R. repens*

*R. angustiflora*, Benth & Hook f Gen Pl II 1079 (*R. angustifolia* Lindau in Engl & Prantl Pflanzenfam IV 3B, 411), is a large flowered American *Ruellia*, which appears to spread from gardens in Malaya, it was collected in Penang by Stoliczka in Singapore by Deschamps and Hullett n 176 ]

### 8 APORUELLIA, C B Clarke, n gen

Pollen with minute prickles or papillæ or granulated not honey combed, otherwise as *Ruellia*



To *Aporuella* may be referred *Ruellia flagelliformis*, Hemsley, *R. trichotoma*, Nees, *R. acaulis*, R. Brown, *R. spiciflora*, Benth., *R. australis*, R. Brown, *R. Guppyi*, Hemsley, and several other South east Asian unnamed plants. Whereas all the Hindostan species of *Ruellia* have honeycombed pollen, the species of *Aporuella* come from Malaya, South China, and Australia.

1 *APORUELLIA SUMATRENSIS*, C. B. Clarke, n. sp. Stem 11 in high, with few or small leaves except at the base. Lower leaves lamina 5 by 1.5 in., entire, sparsely puberulous, tip obtuse, triangular, base attenuated, upper surface dotted, the raphides obscure, petioles up to 1.5 in. long. Flowers in distant small clusters on long-peduncled spikes. Floral leaves passing into bracts, ovate or obovate, minutely pubescent, very variable in size. Calyx 1.75 in. long, divided rather more than half way down, teeth 5, linear. Corolla 3.5 in. long, tube linear. Stamens 4, didynamous, anthers subsimilar, of two parallel mucous cells, filaments glabrous, pollen small globose, 25  $\mu$  in diam., granular. Style hairy, one branch linear, the other nearly wanting. Capsule 6 in. long, seed bearing from the base, seeds about 12, ovate, compressed, shaggy with hygroscopic hairs on the margin.

SUMATRA. R. Moesic alt 600 ft, H. O. I. orbis 2636.

Var.  $\beta$  *Ridleyi*, C. B. Clarke. Leaves more obovate than in the type, completely rounded at the top, flowers pure white (Ridley).

SILANGOR. Batu Caves, Ridley 8213, Kuala Lumpur, Curtis 2364.

2 *APORUELLIA AXILLARIS*, C. B. Clarke, n. sp. Branches (seen) 1 foot long, undivided, internodes 2 in. long. Leaves opposite, equal, blade 3.25 by 1.5 in., ovate-triangular, subobtuse, slightly hispidulous, suddenly attenuate at base, petiole .25 in. long. Flowers in clusters of 1 to 3 in the axils, supported by oblong bracts .25 to .35 in. long. Sepals 5 linear, 2 in. long pubescent. Corolla 8 in. long, narrowly-funnel shaped. Stamens 4, anther cells 2, parallel, oblong, obtuse at base, pollen globose, 45  $\mu$  in diam., papillose, subechinate. Capsule nearly 5 in. long, stalked, with 7 flattened seeds in the clavate head.

MALAY PENINSULA. Songkah, Curtis.

This plant in habit, leaves, inflorescence, corolla, capsule—simulates the very common *Ruellia prostrata*, Lam. var. *dejecta* the pollen is unlike.

## 9 *STENOXYRUS*, C. B. Clarke, n. gen.

Inflorescence a terminal, peduncled, compound, many-flowered, nearly glabrous, subebracteate linear panicle (8 to 12 by 7.5 in.), otherwise as *Hemigraphis*.

This genus agrees in character very closely with the Tropical African genera *Mellera* and *Paulo Hillebrandia* but the habit and hairs are very different.

1 *STENOHYRSUS* RIDLEY, C B Clarke, n sp. *Upper leaf* blade up to 8 by 2 in, obovate lanceolate, acuminate at either end, acute, nearly glabrous, entire, reticulate, full of raphides. *main nerves* 12 pair, oblique, *petiole* 1.5 in long. *Peduncle* 1 to 4 in, *thyrsus* interrupted at base, of 20 to 50 flowers, clustered in very small opposite cymes, bracts inconspicuous, setaceous. *Calyx* 1.75 in long, *sepals* 5, linear, full of raphides. *Corolla* 1 to 1.5 in long, blue, tube cylindric, narrow-campanulate in the upper half, minutely hairy. *Stamens* 4, subsimilar, filaments glabrous, connected in pairs. anthers long, of 2 linear-oblong cells at equal height, pubescent, minutely 1 to 2 mucronate at the base, connective mucronate at tip, pollen globose, 40  $\mu$  in diam, longitudinally 20 ribbed. *Style* thinly hairy, with one oblong linear and one suppressed branch. *Capsule* (not ripe) narrowly ellipsoid, glabrate, seed bearing from the base, with eight ovate flattened seeds.

*PEERAE* Tambun Loh, *Ridley* 9770, Ipoh, limestone rocks, *Curtis* 3149

Ridley placed this plant close to *Strobilanthes* the numerous capsules are all 8 seeded. There are, on one sheet three thyrses 8 to 12 by 1 in. and one thyrsus reduced (apparently accidentally) to a dense head.

#### 10 *HELMIGRAPHIS* Nees

Herbs or undershrubs. *Leaves* opposite, subequal, often crenate, sometimes lobed, upper surface with raphides, which are sometimes altogether obscure. *Flowers* in terminal spikes, or rarely in 1 to 3 flowered small heads on axillary peduncles. bract usually exceeding the calyx, lanceolate or ovate. prophylla linear, short or 0. *Calyx* deeply 5 fid, segments lanceolate linear or linear, subequal. *Corolla* tubular campanulate, blue to white, lobes rounded, twisted in the bud. *Stamens* 4, didynamous, anthers of 2 oblong, subequal, parallel, mucous, glabrous cells, filaments glabrous, or the 2 longer with many long hairs, pollen rather large, from short-ellipsoid to oblong ellipsoid, the 12 to 16 longitudinal ribs reaching to the poles, stopples 2. *Ovary* oblong, with 6 to 12 ovules, usually hairy at tip. style shortly hairy at base, stigma of one elongate and one suppressed lobe. *Capsule* oblong or linear-obovoid, slightly flattened, hardly stalked, seeds 6 to 12, ovoid, flattened, with much hygroscopic hair on the margin.—Species 30 perhaps, in South east Asia and Polynesia.

To this genus belong *Ruellia repanda* Linn, *R. Ravennensis* Nees, *R. minor* Zoll, *R. colorata*, Nees, and, as Bentham says, most of Nees first section of *Ruellia*.

Sect 1 Flowers less than .75 in long, 1 to 3 together in small short peduncled heads .. .. 1. *H. Ridleyi*

Sect 2 Flowers less than .75 in. long, in rather loose spikes —

Sepals softly hairy, tips ligulate triangular —

Mature leaves nearly glabrate .. .. 2 *H. confinis*

Mature leaves hairy . . . . 3 *H. hirsuta*

Sepals with linear subulate white hispid tips —

Capsule hardly .25 in long, nearly terete . . . 4 *H. alternata*

Capsule more than .25 in long, obovoid, flattened . . . 5 *H. platycarpus*

1 *HEMIGRAPHIS RIDLEYI*, C B Clarke, n sp *Branches* (seen) 1 foot long, rambling or creeping, rooting, scabrid-pubescent with small sub-erect hairs *Leaves* in equal opposite pairs, blade 2 by 1 in, ovate elliptic, acute, crenate upper surface with few scattered several-celled bristles (few of these bulbous at base), and with many conspicuous raphides petioles .25 to .35 in long *Flowers* 1 to 3 in small heads on axillary peduncles .175 to .25 in long, bract oblong .35 in long, bracteoles (prophylla) linear, hardly half as long as the calyx *Calyx* .175 in long, sepals lanceolate linear, with several celled white hairs *Corolla* .5 in long *Stamens* and anthers of the genus, filaments with long white simple hairs pollen 60 by 30  $\mu$ , with 12 to 16 ribs and two large stopples *Ovary* oblong, 8 ovulate, glabrous, but hairy at the top *Style* slightly hairy at the base, one stigmatic branch elongate, the other suppressed *Capsule* not seen

PAHANG *Ridley* 2180 (probably *H. confinis*, Ridley in Trans Linn Soc ser 2, III 332 (1893))

This is allied, in inflorescence and habit to *Hemigraphis ravacensis* (Nees sub *Ruellia*)

2 *HEMIGRAPHIS CONFINIS*, T Anders in Journ Linn Soc IX 463 (1867) *Stem* 2 feet, branching, pubescent *Leaves* blade up to 4 by 1.7 in, elliptic, narrowed at either end, obscurely crenate, mature a grey-green and nearly glabrous, raphides in the upper surface obscure, petiole .25 in long *Spikes* 1 to 2 by 7 in, continuous but rather loose, bract .5 in long, obovate or elliptic with triangular tip, prophylla linear, hardly half as long as the calyx *Calyx* .35 in long, softly hairy, sepals ligulate upwards with triangular tip *Corolla* .5 in long *Stamens* of the genus, filaments nearly glabrous, pollen 50 by 30  $\mu$ , with 12 to 16 longitudinal ribs and no stopples *Ovary* glabrous, except at the tip, style of the genus *Capsule* .25 in long, slightly flattened, glabrous except at the tip, 8-seeded nearly from the base C B Clarke in Hook f Fl Br Ind IV 423 *Ruellia confinis*, Nees in DC Prodr XI 148, Miq Fl Ind Bat II 788

MALACCA *Cuming* 2354, *Griffith* (K D) 6188 *Hervey*, *Hullett Maingay* 1754, 3147, (K D) 1174 —DISTRIB Borneo

3 *HEMIGRAPHIS HIRSUTA*, T Anders in Journ Agri Hort Soc Ind N S I 270 (1868) Hairy Leaves (even fully mature) hairy beneath, the upper surface densely clothed by conspicuous rhaphides, otherwise as *H confinis*, T Anders *Justicia hirsuta*, Vahl Symb II 3, Enum I 121 *J brunelloides*, Lam Illustr I 40 *Nelsonia hirsuta*, Roem & Sch Syst I 172

MALACCA *Ridley* 10759 —DISTRIB Java, Borneo

This may be esteemed merely a hairy var of *H confinis* but was kept up by T Anderson There are several other Malay sp of *Hemigraphis* very closely allied

4 *HEMIGRAPHIS ALTERNATA*, T Anders in Journ Linn Soc VII 114 (1864) Stem 12 to 18 in, rooting near the base, pubescent Leaves blade 2.5 by .75 to 1 in, narrowed at either end obscurely crenate, mature sparsely hispid pubescent upper surface sprinkled with rhaphides, petiole .25 to .5 in long Spikes 5 to 1.5 in long, loose bract 5 to 7 in long, oblong subacute, hispid on margins (alyr .35 in long sepals lanceolate with linear tips, lower part glabrate, densely covered with rhaphides, tips with some several celled white hispid hairs Corolla, stamens, ovary, as of *H confinis*, T Anders (capsule scarcely .25 in long, very little compressed, not obovoid, with 10 to 12 seeds placed subequally along its whole length, glabrous except at the tip *Ruellia alternata*, Burm Fl Ind 135 (excluding tab Rhceder) *R discolor*, Nees in DC Prodr XI 149 *R Blumeana*, Nees in DC Prodr XI 149, Miq Fl Ind Bat II 789 (as to his var (Zollinger 660) only)

PAHANG *Ridley* 2183 ("flower white") JOHORE *Ridley* 11129 —DISTRIB Java, Sumatra

Described from the Nees two types (Zollinger 343, 660) written up by his hand at Kew. Miquel's "*R Blumeana*" (named by his hand and the same plant issued as *R Blumeana* from the Buitenzorg Garden) is *Hemigraphis Decaisneana*, T Anders a species that has the capsule hairy to the base, and the leaves tubercular scabrous

5 *HEMIGRAPHIS PLATYCARPOS*, C B Clarke, n sp Spikes longer, denser (than in *H Blumeana*), with broader bracts, more softly hairy, less hispid Capsule exceeding .25 in long, linear obovate, much flattened, with 8 seeds, sterile at the base, otherwise as *H Blumeana*

PAHANG *Ridley* 1408 JOHORE *Ridley* 11128

## 11 ENDOPOGON, Nees

Fertile stamens 2, otherwise as *Strobilanthes* — Species 20, in South (or East) India, extending to Singapore

This genus is hardly worth re-establishing as a split-off from *Strobilanthes*, but Lindau has introduced the point of "2 fertile stamens only" into his diagnosis of *Pseudostenophyllum*, so that it is necessary either to call *Endopogon* a genus or to re unite both in *Strobilanthes*. *Strobilanthes* is so very large that it is as convenient to treat it under 4 genera as under 4 subgenera.

1 ENDOPOGON RIDLEYI, C B Clarke, n sp. Puberulous. *Leaves* opposite, unequal, up to 6 by 2 in., elliptic, acuminate at either end, subentire, upper surface with scattered raphides. *Petioles* up to 1 in. long. *Peduncles* 0 to 7 in. long, one from each axil (i.e. in opposite unequal pairs), each carrying one green strobilate spike, pendent in flower, 1 to 1.5 in. long, bracts 7.5 in. long, elliptic, acute, almost papery, loosely but closely imbricate, adnate at the base. *Flowers* 2, sessile, under each bract, without prophylla. *Calyx* 1.25 in. long, 5 fid to the base, sepals pubescent, 2 lanceolate-linear, 3 linear. *Corolla* .25 in. long in the bud (perhaps not much longer when expanded), white. *Stamens* 2, fertile, filaments glabrous, pollen 60 by 40  $\mu$ , longitudinally ribbed. *Ovary* (and style) glabrous, with 2 ovules in each cell.

SINGAPORE Stagmount, Ridley 5987, 11255

Allied to *S. adnatus*, C B Clarke in Hook f 11 Br Ind IV 436 which is an *Endopogon*.

## 12 STROBIANTHES, Blume

Herbs or undershrubs. *Leaves* opposite, often very unequal, sometimes falsely alternate, crenate serrate or subentire, the upper surface usually full of raphides. *Inflorescence* various, the flowers often in heads or strobilate, sometimes solitary in lax panicles, sometimes in small clusters which are paniced, floral leaves prominent or small, persistent or caducous often passing into true bracts ("deckblaetter") in the upper part of a spike, bracteoles (prophylla) 2, often similar to the sepals, or wanting (but in the axil of a bracteole a bud is sometimes to be found). *Calyx* of 5 (usually rather large) segments, subequal, divided nearly to the base in the Malay species. *Corolla* tubular-campanulate, lobes rounded, twisted in the bud. *Stamens* (fertile) 4, didynamous, anther-cells 2, mucous, pollen large, ellipsoid (rarely subglobose), with 16 to 20 (rarely few) longitudinal ribs and 2 stopples. *Ovary* oblong or ellipsoid with 2 ovules in each cell, sometimes stalked, style with one long branch, the other suppressed. *Capsule* oblong or

narrow-ellipsoid, short-stalked, 4-seeded, or in many species with only 2 seeds — Species about 200, *i.e.* after the genera *Endopogon*, Nees, *Pseudostenosiphonium*, Lindau, and *Acanthopale*, C B Clarke have been taken out extending from warmer Africa to China and Australia

Sect 1 Heads capitate occluded (except the corollas) between two erect persistent bract like floral leaves —

- |   |   |                          |
|---|---|--------------------------|
| Leaves scarcely hairy, bracts obtuse                            | 1 | <i>S. Maingayi</i>       |
| Leaves pubescent, bracts produced in a strongly crenulate tip   | 2 | <i>S. hirsuticentus</i>  |
| Leaves rufous ciliate on margins, bracts with some rufous hairs | 3 | <i>S. hirsutisepalus</i> |

Sect 2 Flowers strobilate or in short heads, with conspicuous rufous hair —

- |   |   |                           |
|---|---|---------------------------|
| Heads ovoid 1 in long bracts 5 in long, linear                    | 4 | <i>S. rufosepalus</i>     |
| Heads strobilate 2.25 in long, bracts 7 in long spatulate oblong  | 5 | <i>S. rufostrobilatus</i> |
| Heads capitate 1.5 in long bracts 7.5 in long linear              | 6 | <i>S. rufocapitatus</i>   |
| Heads 2 to 3 flowered very small, bracts 2 to 1 in long spatulate | 7 | <i>S. rufopauper</i>      |

Sect 3 Flowers strobilate with grey hairs

8 *S. Dyerianus*

Sect 4 Flowers panicled bracts caducous or inconspicuous —

- |   |    |                        |
|---|----|------------------------|
| Panicle 8 by 5 in the flowers in opposite distant parts | 9  | <i>S. collinus</i>     |
| Panicle 6 by 1 in branches scarcely 2.5 in long         | 10 | <i>S. pachyphyllus</i> |

1 STROBILIANIHS MAINGAYI, C B Clarke in Hook f Fl Br Ind IV 448 (1884) Perennial, 2 to 4 ft high, sparingly pubescent. Leaves opposite often very unequal, the larger 3 by 1 to 1.25 in crenulate tip acuminate midrib beneath minutely scabrid, surface beneath often microscopically fufuraceo puberulous, rarely at all hairy petiole 1.25 to .25 in pubescent. Flowers 1 to 5, capitate in an ovoid subsessile head enclosed by two ovate erect floral bract like leaves bract 1 by .25 in, quadrate oblong, keeled, tip rather wide subobtuse, crenate prophylla similar to sepals. Sepals 4 in long glabrous, oblong subacute, membranous. Corolla 2 in long, white (so noted on several collections) tube long, narrow, funnel shaped, linear at base. Stamens 4, fertile subsimilar anthers oblong filaments glabrous, except sometimes 2 or 3 hairs close to the base pollen ellipsoid, large (70 by 40  $\mu$ ), with 12 to 16 longitudinal ribs and 2 stopples. Style with a few scattered hairs. Capsule (not seen in the type examples) oblong, .5 in long, with 4 seeds, shaggy all over with hygroscopic hairs.

PERANG Maingay (K D) 1182 alt 1800 to 2000 ft, Ridley 7167 King's Collector 1545, 1791 KLDAN Curtis 298 PFRAN 3000 to 4000 ft, King's Collector 8316 SILANGOR Kelsall 2004

The "type" of *S. Mainqay* (K.D 1182) has supplied neither flower nor fruit the above description is taken largely from Curtis 296. In King's Collector 1545, the collector notes "flowers dark blue, white inside", but I can find no difference between this n. 1545 and n 1791 (noted as having white flowers) collected by the same collector in the same locality

2 *STROBILANTHES BIBRACTEATUS*, Blume Bijdr 799 (1825) Rather more pubescent than *S. Mainqay* Leaves often with scattered hairs on the surface beneath Tips of the bracts produced, conspicuously toothed Filaments, in their whole lower half, with long, deflexed several-celled hairs, otherwise as *S. Mainqay* Miq Fl Ind Bat II 801 *Goldfussia bibracteata*, Nees in DC Prodr XI 174 *Dactyloctenium ? crenata*, Miq Fl Ind Bat II 844

PERAK Maxwell's Hill, Ridley 5516, Wray 174, 1674, *Scortechini* 337, 1413 —DISTRIB Java, Sumatra

There is another closely allied plant collected in Sumatra (Forbes 1906), which differs little but by having the flowers "pale purplish blue" *S. erosus*, Nees in DC Prodr XI 181, appears to be this species, as Nees suspected, but I have seen no authentic example of *S. erosus*

3 *STROBILANTHES HIRTISEPALUS*, C B Clarke, n sp More hairy than *S. bibracteatus*. Leaves minutely rufous hairy on the margins Floral leaves (involucral bracts) with rufous hairs Sepals linear, very hairy, with rufous several celled hairs Otherwise as *S. bibracteatus*

PERAK Larut, alt 1000 to 1500 ft, King's Collector 2215 *Scortechini* 940

4 *STROBILANTHES RUFO SIPALUS*, C B Clarke, n sp Branches 18 in long, rufous hairy, procumbent, divided, rooting near the base Leaves opposite, one about twice as long as the other, longer one 2.25 by .25 in, elliptic-acuminate, crenate, sparsely hispid on the upper surface, rhaphides obscure, petiole 2 in long Heads 1 in long, ovoid, few-flowered, terminal and axillary Bracts linear, 5 in long, with several-celled bright-rufous hairs Sepals 35 in long, linear-subulate, with several celled bright-rufous hairs in the upper half Corolla 1 in long, tube campanulate from a short linear base Stamens 4, longer filaments hairy in their lower half, pollen 50 by 30  $\mu$ , longitudinally ribbed Style glabrous, except close to the apex of capsule Capsule 35 in long, glabrate, with 4 young seeds

PENANG alt 2000 ft, Ridley & Curtis 2761 PERAK *Scortechini*, Ipoh, Curtis

This species is near *Strobilanthes anamiticus*, O Kuntze Revisio, I 498 (1891)

5 *STROBILANTHES RUFO-STROBILATUS*, C B Clarke, n sp Branches rufous-hairy, creeping, rooting at the base Leaves opposite, nearly equal, 4 by 2 in, cuneate at either end, crenate, nearly glabrate on the upper surface, petiole 5 in long Heads strobilate, 2 to 2.5 in long, bracts (floral leaves) prominent even to the top of the head, 7 by 2.5 in, narrowed at either end, bracts 5 in long, linear-spathulate, densely rufous with several-celled hairs Sepals 4 in long, linear, rufous-hairy Corolla 1.25 in long, tube campanulate, curved, lobes "purple" (Scortechini) Stamens 4, filaments hairy Ovary pubescent at the apex, 4-ovulate, pollen 70 by 40  $\mu$  longitudinally multi-striate

PERAK Scortechini 225

6 *STROBILANTHES RUFO-CAPITATUS*, C B Clarke, n sp "Shrubby creeper, 6 to 8 ft long" Branches rufous-hairy Leaves subequal or very unequal, up to 8 by 3.5 in, cuneate at either end crenate, upper surface nearly glabrate petioles 3.5 in long Heads sessile or peduncled, 1 to 2 in long, densely clothed with bright rufous several celled long hairs, bracts (floral leaves) 7.5 by 12.5 in, linear, shaggy on the margin, with rufous hairs 12.5 in long, bracts 2.5 to 3.5 in long, rufous-hairy sepals linear, 2.5 in long, rufous hairy "Corolla white"

PERAK alt 2500 to 3000 ft, King's Collector 10935, Scortechini 568

7 *STROBILANTHES RUFO-PAULUS*, C B Clarke, n sp Slender, procumbent, rooting at the nodes, pubescent Leaves opposite, more or less unequal, up to 2 by 7 in, elliptic lanceolate, crenate, upper surface nearly glabrous petioles 12.5 to 25 in long Heads very small 2 to 3-flowered bracts (floral leaves) 2.5 to 1 in long, very narrowly spatulate, sparingly or obscurely hairy, bracts 2.5 in long, linear, more or less rufous hairy Calyx 2 in long, sepals linear, pubescent, with long several celled straight rufous hairs at the tips Corolla 1 in long, "blue" (Ridley), nearly straight, narrow-funnel shaped Stamens 4 filaments glabrous, pollen 70 by 40  $\mu$  longitudinally ribbed Ovary and style glabrous Capsule with 4 hairy seeds

PERAK Maxwell's Hill, alt 3000 ft, Wray 4192, the Cottage, alt 5000 ft, Ridley 5515

8 *STROBILANTHES DYERIANUS*, Masters in Gard Chron ser 3, XIII 442 (1893) Shrubby, vagant Leaves opposite, unequal, sessile, blade of the larger one up to 7 by 3 in, elliptic lanceolate, subacute, crenulate, nearly glabrate, often auricled at the base Peduncles axillary, 1 to 3 in long, with scattered, small, ovate leaves (7.5 in long), each terminated by a strobilate spike 1 to 2 in long, pubescent (without rufous hair) Bracts 2.5 to 3.5 in long, round-obovate Corolla 1.3 in long, violet-blue Stamens 4, filaments glabrous, anther-cells short-oblong,



pollen 50  $\mu$  long, 30  $\mu$  broad, with 12 to 14 strong longitudinal striations Kew Bull 1894, Append II 51, Hook Bot Mag t 7574

PFNANG *Curtis*

This may not be indigenous in the Malay Peninsula A note of Curtis says "originally collected in Burma by Boxall

9 STROBILANTHES COLLINUS, Nees in Wall Pl As Rar III 86 (1832) Attains 4 ft Leaves opposite, equal, up to 10 by 3 in, elliptic, acuminate at either end, serrate, nearly glabrous, clothed with raphides on both surfaces, petiole hardly 1 in long Panicles terminal, open, often 8 by 5 in, the flowers sessile, distant, in opposite pairs along the pubescent branches bracts narrowly obovate oblong, obtuse, 75 in long, early falling Sepals 5, subequal, 25 in long, linear, hairy Corolla 15 in long, narrow, tubular campanulate white tinged pink Stamens 4, filaments hairy, pollen ellipsoid, longitudinally striate Ovary and style pubescent Capsule 7 in, linear-oblong, pubescent, seeds 4 hairy Nees in DC Prodr XI 192, Miq Fl Ind Bat IV 801, T Anders in Journ Linn Soc IX 476 (1867) C B Clarke in Hook f Fl Br Ind IV 465 *Ruellia collina*, Wall Cat 2343

SINGAPORE Lobb PENANG Wallich 2343 PERAK alt 2000 ft, Curtis 1313, alt 300 to 800 ft, King's collector 7271, 8490

10 STROBILANTHES PACHYHYLLUS C B Clarke, n sp Shrub, up to 4 ft high Leaves opposite, equal, 5.5 by 2 in, elliptic, obscurely obovate, acute at either end, under surface pubescent ("silvery grey when fresh), densely clothed with raphides, obscurely serrate, remarkably thick, hard in texture petiole 15 in Panicle terminal, long peduncled, 6 by 1 in lateral branches scarcely 25 in long Sepals 5, subequal, 25 in long, linear, glabrous, full of raphides Corolla 1.25 in long, very narrowly tubular campanulate, light blue Stamens 4 filaments hairy in the lower half, anthers oblong, mucous, pollen exactly globose, 40  $\mu$  in diam, 20 ribbed, 2-stopped Style thinly hairy

PERAK hill top, *Scortechini* 1786, alt 1600 to 2000 ft, King's Collector 7150

The material represents the species imperfectly it appears allied to *S. collinus* Nees, the texture of the leaves is distinctive, and the globose pollen is very unusual in the genus *Strobilanthes*

### 13 ACANTHOPALE, C B Clarke, n gen

Pollen globose, echinate, without ribs, otherwise as *Strobilanthes* Species 8, in tropical Africa with Madagascar, and many Indian

Among the *Strobilanthes* to be removed to *Acanthopale* are *S. lanceolatus*, Nees, *S. pulneyensis* C B Clarke, *S. Zenkerianus*, T Anders, *S. Arnottianus*, Nees

*S. exsertus*, C. B. Clarke; *S. iziocephalus*, Benth., *S. Gardnerianus*, T. Anders., *S. vestitus*, Nees, *S. laxus*, T. Anders.; *S. Hookeri*, Nees; *S. Andersonii*, Benth.; *S. bolamputtensis*, Bedd., *S. acrocephalus*, T. Anders., *S. radicans*, T. Anders.; *S. debilis*, Hemsl., *S. divaricatus*, T. Anders., *S. oliganthus*, Miq., *S. japonicus*, Miq.

1 ACANTHOPALE? MALASICA, C. B. Clarke, n. sp. Branch nearly round, glabrate, at the tip sparsely hairy. Leaves opposite, equal, blade 2.5 by 1 to 1.5 in., elliptic-triangular, nearly entire, scarcely pubescent, upper surface with raphides, tip hardly acute, base deltoid, petiole .25 in. long. Flowers in poor, axillary, sessile or short-peduncled spikes, floral leaves caducous, not seen. Bract .5 in. long, linear-ligulate, glabrous, bracteoles (prophylla) .25 in. long, linear, glabrous. Sepals 5 equal, .25 in. long, linear, slightly hairy at the tips. Corolla .75 in. long at least, nearly glabrous. Stamens 4, perfect filaments glabrous, anthers oblong, mucicous, parallel, at equal height, pollen globose, 50  $\mu$  in diam., with bluntish spines, not ribbed. Ovary glabrous, style thinly hairy, one branch long, the other suppressed. Capsule .7 in. long, with a long sterile base, seeds 4, crowded in the globose head, hygroscopic shaggy.

KI DAH Lankawi Island Ridley 8298

The doubt as to the genus of this plant arises because the specimen is in such a state that I am not sure that the grain of pollen described may not have been a stray grain.

#### 14 ACANTHUS, Linn.

Harsh glabrous shrubs. Leaves often prickly. Flower showy, spiked, bract ovate, prophylla (bracteoles) 2 or 0. Calyx 4-partite nearly to the base, 2 inner segments much narrower than the 2 outer, subopposite. Corolla strongly 2-lipped, the posterior lip 0, the truncated close to the base, anterior lip 3-lobed, nearly flat, blue or white, the mid-lobe bifid. Stamens 4, subsimilar, filaments glabrous. Anthers 1-celled, oblong, mucicous, conspicuously fringed by white hairs. Pollen ellipsoid, with 3 narrow longitudinal chinks. Ovary with 2 to 4 ovules in each cell. Capsule ellipsoid, woody, large, shining brown, 2- (rarely 4-) seeded. Seeds discoid, without hairs. — DISTRIBUTION Species 8 or 10, extending from South Europe and Africa to Polynesia.

Stiff, erect shrubs —

Corolla 1.25 in. long, blue, prophylla .25 in. long	1 <i>A. ilicifolius</i>
Corolla .75 in. long, white, prophylla 0	.. 2. <i>A. bracteatus</i>
Twining subscandent	3 <i>A. volubilis</i>

1 ACANTHUS ILICIFOLIUS, Linn. Sp. Pl. 639 (1753). Shrub with many stout branches, 1 to 5 ft. high. Leaves 4 to 7 by 1 to 3 in.,

subpinnatifid, spinous, nearly sessile. *Spikes* 6 by 1·5 in., bracts ·3 in. long, ovate; prophylla ·25 in. long, triangular-lanceolate. *Calyx-segments*, 2 outer subsimilar, 5 to ·7 by ·3 in., round-ovate; 2 inner (alternate with the outer) shorter, much narrower. *Corolla* 1·25 in. long or more, blue. *Capsule* 1 by ·5 in., seeds large, with close brain-like convolutions. Benth. Fl. Austral. IV. 548 (*partly*), C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481 (*with syn.*), Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 319, Hemsl. in Journ. Linn. Soc. XXVI. 242 (1890); Prain Beng. Plants 800.

PENANG: *Deschamps*, King. MALACCA: *Griffith*. SINGAPORE: *Ridley* 8097. PERAK: *Wray* 2494, 2499, *Scortechini*.—DISTRIB. In saline mud, from Africa to Polynesia.

VAR.  $\beta$  *integrifolia*, T. Anders. *Axillary peduncles* numerous, running into large terminal panicles, leaves elongate, lanceolate, entire or nearly so.—DISTRIB. Andamans

2 ACANTHUS EBRACTEATUS, Vahl Enum. II 75, t 40 (1791). *Bracts* caducous, prophylla 0 *Calyx* ·3 in. long. *Corolla* ·75 in. long, white, otherwise as *A. ulcifolius*, Linn. C B Clarke in Hook f. Fl. Br Ind. IV 481, Lindau in Engl. & Prantl Pflanzenfam IV. 3 B, 319, Ridley in Trans. Linn Soc ser 2, III. 332 (1893), and in Journ. As. Soc Straits 121 (Singapore 1900).

MALACCA. *Griffith*, *Murray* 3084. PAHANG *Ridley* 1276.—DISTRIB. Salt marshes, from the Andamans to Cochin-China and Java.

Bentham doubts whether this species is distinct from *A. ulcifolius*, Linn. Ridley n. 1276 is a typical example of *A. ebracteatus*, with flowers very much smaller than those of *A. ulcifolius*.

3. ACANTHUS VOLUBILIS, Wall Pl As. Rar II 56 t 172 (1831) Twining, unarmed. *Leaves* oblong or elliptic, entire, glabrous *Spikes* linear-oblong, prophylla 0 *Corolla* white, 1 in long Kurz For Fl II 242, C B. Clarke in Hook. f. Fl Br Ind IV 481, Ridley in Journ As Soc. Straits 121 (Singapore 1900). *Diluviana volubilis*, Nees in Wall. Pl. As. Rar. III 98 *D. scandens*, Nees in DC Prodr XI 269.

PENANG. *Curtis* 510. SINGAPORE fide *Ridley*.—DISTRIB. Coast of India, Siam, Malaya, Australia.

The dried tips of the branches are difficult to separate from those of *A. ebracteatus*, the leaves are usually entire or slightly prickly; the flowers larger.

## 15. GYMNSTACHYUM, Nees

Herbs or undershrubs, sparingly pubescent. *Leaves* lanceolate to obovate, entire or crenulate, petioled. *Panicle* (in the Malay Peninsula

species) terminal, sometimes of several elongate branches, branches linear, with very small lateral cymes, or reduced to spikes, bracts linear, very small, prophylla hardly any *Calyx* small, less than 2 in long, divided deeply into 5 linear segments, pubescent or puberulous *Corolla* 5 to 1 in long, tube narrow, limb 2 lipped *Stamens* 2, anther-cells 2, oblong, parallel, at equal height, mucous, pollen small, short-ellipsoid, longitudinally (often obscurely) ribbed *Ovary* conic, many ovulate, nearly glabrous, style at tip shortly 2 fid *Capsule* 5 to 1 in long, linear, glabrate, with parallel sides, 8 to 20 seeded from the base *Seeds* ovoid, flattened, obscurely hairy. Species 25 to 30, in South east Asia, North Australia, Polynesia

This genus, varying in size is distinguished by the linear (not clavate) many seeded capsule The small sized group *Gymnostachyum* proper, has (A) the flowers clustered or opposite (B) the flowers solitary alternate, but of the group (A) there is no example from the Malay Peninsula

Stems 1 to 4 in long Flowers solitary in long spikes —

Spikes linear simple Corolla blue toward the base whitish —

Leaves suddenly narrowed on the winged petiole .. 1 *G. decurrens*

Leaves spatulate on the petiole —

Corolla 75 in long or more .. 2 *G. diversifolium*

Spikes linear, somewhat branched, corolla white 3 *G. pallens*

Stem elongate, panicle with many long, linear branches 4 *G. polyneuron*

Stems 1 to 3 ft long, inflorescence terminal, bracts minute, stamens pollen and style as of *Gymnostachyum*, but the capsule is not known in any of the following species —

Panicle 2 to 3 in long short peduncled, flowers 8 to 20 —

Spike slender linear, style hairy 5 *G. simplicicaule*

Spike denser, style glabrous —

Leaves with 5 to 6 pairs of nerves 6 *G. hirtistylum*

Leaves with 9 to 11 pairs of nerves 7 *G. magis nervatum*

Panicle 8 in long usually branched

Leaves not exceeding 25 in in breadth —

Leaves thick attenuate at either end 8 *G. knoxifolium*

Leaves elliptic shortly acuminate —

Panicle with long branches 9 *G. ? scortechinii*

Panicle linear with short lateral cymes 10 *G. Ridleyi*

Leaves 6 in wide . 11 *G. ? magnum*

1 *GYMNOSTACHYUM DECURRENS* Steud in Kew Bull 357 (1894)  
Stem 1 to 4 in high Leaves up to 5 by 3 in, pubescent beneath, ovate, tip triangular, margin undulate nerves 6 pairs, the lowest patent base suddenly narrowed, often decurrent on the petiole Spikes

linear, 4 to 7 in long (5 on one stem), flowers all solitary, bracts minute, linear *Sepals* hardly 15 in long, linear, pubescent *Corolla* 5 to 6 in long, pubescent, blue *Stamens* 2, filaments glabrous upwards, anther-cells 2, oblong, parallel at equal height, minutely or obscurely mucronate at base, pollen ellipsoid, 20  $\mu$  long, obscurely ribbed longitudinally *Ovary* minutely pubescent, style thinly hairy, with one branch suppressed *Capsule* 7 in long, linear, glabrate, 20-seeded

PAHANG *Ridley*

2 *GYMNOSTACHYUM DIVERSIFOLIUM*, C B Clarke, n sp Creeping *Stems* 1 to 4 in *Leaves* up to 5 by 2.25 in, slightly pubescent beneath, ovate, tip triangular margin entire, nerves 8 pairs base suddenly narrowed, shortly decurrent on the petiole, or (on every plant) one leaf truncate or cordate at base *Spikes* linear, 2 to 5 in long, 1 to 3 on one stem, flowers all solitary, bracts minute or none *Calyx* scarcely 15 to 2 in long *Corolla* 75 in long or rather more Otherwise as *G. decurrens* Stapf

KEDAH *Curtis* 2530 PERAK alt 400 to 600 ft, *King's Collector* 8284, 936, *Scortechini* 1589

In every plant the leaves are decurrent on the petiole, but there are one or two upper leaves truncate or even cordate at base, the same may be observed in several of these small *Gymnostachyums*. This plant is nearly allied to *G. decurrens*, Stapf the leaves are of thinner texture, with thinner nerves

3 *GYMNOSTACHYUM PALLENS*, C B Clarke, n sp Rhizome 1.5 in long, woody, nodose *Stem* 5 to 1 in long *Leaves* blade 4 by 2.5 in, broad ovate, tip subobtusate, nearly glabrous, shortly decurrent on the petiole, margin wavy-crenate, upper surface densely punctate, lower surface pale green *Spikes* 3 to 4 in long, on a 3 to 4 in peduncle, slightly branched, minutely pubescent, flowers solitary *Calyx* 125 in long *Corolla* 5 in long, white *Capsule* rather more than 5 in long

PERAK alt 300 to 500 ft, *King's Collector* 8133

4 *GYMNOSTACHYUM POLYNEURON*, C B Clarke, n sp Top of stem leafy, 3 in long (seen) *Leaves* spatulate, blade ovate, 5 by 2.25 in, tip triangular-obtusate, nearly glabrous, primary nerves 10 pairs, petioles 1.5 in long *Panicle* terminal, compound, ultimate spikes 2 to 5 in long, linear, flowers distant, solitary, subsessile *Sepals* 125 in long, linear, nearly glabrous *Corolla* 5 in long, 'lower lip deep violet, upper white splashed with violet' *Stamens* 2, anther-cells 2, narrow oblong, at equal height, not tailed, pollen ellipsoid, 30  $\mu$  long, with 2 stopples and 2 longitudinal rows on either side of each stopple *Ovary*

nearly glabrous, style shortly 2-fid, thinly hairy in the lower half  
*Capsule* 5 in long, linear oblong, glabrate, with 10 seeds

SIAMESE STATES Songkhla, *Curtis*

5 *GYMNOSTACHYUM SIMPLICICAULE*, C B Clarke, n sp Slightly pubescent *Stem* 1 to 2 ft long, undivided (in any example seen) *Leaves* blade 3 by 1 in, elliptic, obtusely triangular at either end, entire, nerves 5 to 6 pairs, obscure, petioles 25 to 5 in long *Panicle* terminal, few-flowered, reduced almost to an oblong spike, peduncle hardly 1 in long, bracts minute *Sepals* hardly 125 in long, linear *Corolla* hardly 5 in long, grey-yellow, 2-lipped *Stamens* 2, filaments glabrous anther cells 2, narrowly oblong, parallel, nearly at equal height, mucous, pollen 30 by 15  $\mu$ , narrowly ellipsoid, stopples 2, longitudinally obscurely ribbed *Style* upwards glabrous, very shortly bifid at tip

PERAK alt 3000 to 3500 ft, *King's Collector* 893, 935, 2394, *Scortechini* 688

6 *GYMNOSTACHYUM HIRTISTYLUM*, C B Clarke, n sp Glabrate, the inflorescence pubescent *Stems* nearly a foot high, simple, decumbent, rooting at the base *Leaves* opposite, equal, blade elliptic acute, 4 by 2 in, without rhaphides base broadly cuneate, nerves 6 to 7 pairs, petioles 2 in long *Inflorescence* of 2 terminal, simple, linear, slender, interrupted, bracteate spikes peduncles 5 to 1 in long flower clusters of 1 to 2 flowers opposite, the lower pairs distant *Sepals* hardly 125 in, linear *Corolla* white very small, with a short tube *Stamens* 2 anther cells 2, at equal height, not tailed pollen very shortly ellipsoid *Style* hairy, tip shortly bifid

PERAK alt 400 to 600 ft, *King's Collector* 10814

7 *GYMNOSTACHYUM MAGIS NERVATUM*, C B Clarke, n sp Almost glabrous *Stem* 12 to 18 in, decumbent, rooting near the base, branched *Leaves* opposite, equal blade 3.5 by 1.3 in, elliptic-lanceolate, acuminate at either end, nerves 9 to 11 pairs, oblique, both surfaces with rhaphides, the lower also densely, minutely dotted, petioles 2 in long *Peduncles* terminal, hardly 5 in long *Spikes* 2.5 in long, simple, flowers 12 to 20, opposite, bracts minute *Sepals* hardly 1 in long, lanceolate, nearly glabrous *Corolla* 5 in long, very narrow, cream-coloured, 2-lipped nearly half-way down *Stamens* 2, filaments glabrous, anther-cells 2, rather large, oblong, at equal height, mucous, pollen 40 by 25  $\mu$ , with 10 strong longitudinal ribs *Pistil* glabrous, ovules 8 or more

PERAK alt 100 ft, *King's Collector* 6542

8 *GYMNOSTACHYUM KNOXIIIFOLIUM*, C B Clarke n sp Nearly glabrous, except the minutely pubescent inflorescence *Stem* erect, with long

internodes *Leaves* blade 6.5 by 2 in., broadly lanceolate, tapering at either end, texture thick, without raphides, nerves 7 pairs, springing very obliquely and curving inwards petioles 2.5 in long *Panicle* of two branches, branch 8 in long, linear, with small, opposite, distant cymes, bracts hardly 2 in long, linear *Sepals* 0.75 in long, oblong-linear *Stamens* 2, filaments glabrous, each with a minute tooth at base, anther-cells narrow-oblong, parallel at equal height, mucous *Ovary* nearly glabrous, many-ovuled, style thinly hairy, tip minutely 2 fid Buds very young, corolla noted white by collector,

NEGRI-SEMBILAN *King's Collector* 10085

9 GYMNOSTACHYUM ? SCORTECHINII, C B Clarke, n sp *Stem* erect, at least 12 to 18 in high *Leaves* blade 7.5 by 2.5 in., elliptic, acuminate at either end, entire, upper surface with raphides, lower minutely pubescent, petioles 5 to 1.5 in long *Panicle* very young, 8 in. long, with long branches, many-flowered, rusty-pubescent, bracts inconspicuous flowers mostly in approximate opposite pairs *Calyx* 1.25 in long *Stamens* 2, filaments glabrous at top, anther-cells 2, oblong, parallel, at equal height, acute mucous at base, pollen 35 by 20  $\mu$ , with 2 stopples, a longitudinal row of patches (hardly tubercles) on each side of each stopple

PERAK *Scortechini*

The habit of this plant might do for a *Gymnostachyum* near *G. venustum*, T Anders but the genus is doubtful

10 GYMNOSTACHYUM RIDLEYI, C B Clarke, n sp A tall shrub *Leaves* blade 6 to 7 by 2.25 in., elliptic, shortly cuneate acuminate at either end, pubescent beneath petiole 7.5 in long, pubescent *Panicles* (reduced almost to spikes) 2, terminal, 11 by 7.5 in., bracts 1.25 to 2 in long, linear flowers distant, solitary, or in 2 to 4 flowered lateral cymes on peduncles hardly 1.5 in long *Sepals* 1.5 to 2 in long, pubescent *Corolla* white

PERAK *Ridley* 9772

The example shows no corolla, no capsule

11 GYMNOSTACHYUM ? MAGNUM, C B Clarke, n sp A shrub *Stem* glabrate, upper internodes 7 in long *Leaves* blade up to 12 by 6 in., obovate, nearly glabrate, entire, nerves 12 (or more) pairs, upper petioles 3 in long *Panicle* terminal, 8 by 7.5 in., bracts 1.5 to 2 in., linear, peduncle 1.5 in long small cymes 2 to 3-flowered in opposite approximate pairs *Sepals* linear, 2 in long, pubescent *Corolla* in very young bud *Stamens* 2, filaments glabrous upwards, anther-cells 2, parallel oblong, at equal height, mucous

MALACCA Waterfall, *Goodenough* 1893

From the size, habit, and stamens of this plant it is almost certainly either a *Gymnostachyum* or a *Phlogacanthus*

# 16 PHLOGACANTHUS, Nees

Corolla tube cylindric Capsule narrowly ellipsoid, contracted close to the base, otherwise as *Gymnostachyum* — DISTRIB Species 12, in India, 1 or 2 extending a short way east

1 PHLOGACANTHUS BREVIS, C B Clarke, n sp A branched under shrub, 12 to 18 in long Leaves blade 6 by 3.5 in, broadly ovate, tip subobtus base shortly attenuate, nerves 6 to 7 pairs, petiole 1 to 1.5 in long Panicles terminal, 2 to 4 in long, oblong, bracts minute Sepals 15 to 2 in long, linear, minutely pubescent Corolla small (only seen in bud) grey pubescent without Stamens 2, anther-cells 2, oblong, parallel, of equal height, mucous, pollen 20 by 15  $\mu$ , longitudinally banded Pistil glabrous Capsule 1 in long, nearly 2 in wide upwards, subcylindric obtuse, 8 seeded, base narrowed Seeds flat, nearly 125 in in diam

PERAK alt 300 ft King's Collector 2884

The capsule is here typically that of *Phlogacanthus* and not the parallel-sided capsule of *Gymnostachyum* but the two genera may be united

# 17 ANDROGRAPHIS, Wallich

Herbs or very small shrubs Leaves entire Racemes (or spikes) 1-sided axillary and terminal often compounded into loose panicles with spreading branches bract very small, narrow, prophylls hardly any, flowers solitary or in few flowered, distant clusters Sepals 5, rarely more than 2 in long, linear Corolla small (about 5 in long), 2-lipped base tubular, limb white, spotted pink purple in the palate Stamens 2 filaments hairy, anther cells 2, ovate parallel, of nearly equal height base acute (not spurred), with often a tuft of hairs, pollen 25  $\mu$  long, short ellipsoid, with few very slender longitudinal ribs Style thinly hairy, tip minutely bifid Capsule narrowly oblong, with parallel sides, seed bearing nearly from the base, flattened from the back of the valves Seeds 6 to 12, stony, cuboid ellipsoid, smooth, glabrate, with rows of minute pits — DISTRIB Species 18, very closely allied, in India, 1 or 2 extending to China and Malaya

Leaves lanceolate

Leaves ovate

1 *A. paniculata*  
2 *A. tenuiflora*

1 ANDROGRAPHIS PANICULATA, Nees in Wall Pl As Rar III 116 (1832) An erect annual, 1 to 3 ft high Stem quadrangular



*Leaves* 2.5 by .5 to .75 in, lanceolate, glabrous, paler beneath, petioles .25 in long. *Panicle* copious, of lax divaricate racemes, lower flowers in each raceme pedicelled, solitary. *Capsule* .75 by .125 in, nearly glabrous when mature. Nees in DC Prodr XI 515. Wight Ic t 518, Miq Fl Ind Bat II 855, C. B. Clarke in Hook f Fl Br Ind IV 501. Lindau in Engl & Prantl Pflanzenfam IV 3B, 323, Prain Bong Plants 809. *Justicia paniculata* Burm Fl Ind 9, Blume Bijdr 788.

PENANG *Curtis* 1877 — *DISTRIB* Throughout India

2 *ANDROGRAPHIS TENUIFLORA* T. Anders in Journ Linn Soc IX 502 (1867). *Leaves* blade ovate shortly acuminate, 2.5 by 1.5 in, obscurely puberulous, bases shortly spatulate. *Racemes* (often nearly spikes) very slender, straggling. *Corolla* .4 in long. Otherwise as *A. paniculata* Nees. Lindau in Engl & Prantl Pflanzenfam IV 3B, 323. C. B. Clarke in Hook f Fl Br Ind IV 502. *Haplanthus tener*, Nees in Wall Pl As. Raz III 115 and in DC Prodr XI 512.

KIDDAH *Ridley* 8331. *Curtis* 2136, 2578 — *DISTRIB* Eastern India, Malaya.

#### 18 *CYSTACANTHUS* T. Anders

Shrubs or erect herbs. *Leaves* opposite, equal, entire. *Inflorescence* terminal (or axillary in some non-Malay species), panicles narrow, bracts small, prophylls 0. *Calyx* deeply 5 fid, segments narrow. *Corolla* rather large, tubular, curved and inflated, somewhat 2 lipped, segments ovate or oblong, one completely outside in the bud. *Stamens* 2, rarely 2 rudiments added, anthers of 2 oblong, parallel, muticous cells, connective often hispid on the back, pollen subglobose with few longitudinal bands. *Ovary* with 4 or more ovules in each cell. *Capsule* linear, with parallel sides, many seeded, nearly from the base — *DISTRIB* Species 5 in India, 1 extending to Cochin China.

1 *CYSTACANTHUS TURGIDA* Nicholson Diet Gard I 428 (1884). A glabrous shrub 1 to 2 ft high. *Leaves* blade 4 to 7 in long, oblong or narrow elliptic, narrowed at either end, petioles .5 to 1 in long. *Inflorescence* terminal, panicles 1 to 5 in long, dense, flowers clustered on branches hardly 17 in long, bracts inconspicuous, 1.5 to 2 in long. *Calyx* segments 1.25 to .2 in long, linear. *Corolla* 1 in long, white, pink spotted, tube strongly bent close above the calyx and greatly inflated. *Capsule* 1 by .125 in, many seeded, dorsally compressed. *Seeds* ovoid, flattened, densely hairy. Lindau in Engl & Prantl Pflanzenfam IV 3B 325. *Cystacanthus* sp. Benth in Benth & Hook f Gen Pl II 1098. *Menina turqida*, Hook Bot Mag t 6043.

PENANG *Deschamps* — *DISTRIB* Burma, Cochin China.

## 19 ASYSTASIA, Blume

Herbs or undershrubs. *Leaves* opposite, equal or nearly so. *Racemes* subterminal, unilateral, lax at base, sometimes compound pedicels short (0 to 2 in long), alternate or opposite, in bud and flower suberect, bract and 2 prophylla at base of the pedicel small bristles (hardly 125 in long). *Calyx* 2 to 25 in long, divided very nearly to the base into 5 linear or narrow-oblong segments. *Corolla* short or long, tube inflated upwards or linear, lobes 5, imbricated in the bud. *Stamens* 4, didynamous, all perfect, filaments united in pairs at the base, glabrous or slightly hairy near the base, anther cells 2, oblong, parallel, at equal height, at base mucous or minutely auricled, pollen ellipsoid, longitudinally ribbed in the type species. *Ovary* hairy, style long, glabrous except near the base, stigmatic lobes 2 equal, hemiglobose, ovules in each cell 2. *Capsule* oblong, 4 seeded in the upper part, base contracted, sterile. *Seeds* compressed, round, often tubercled or rough, without hairs. Species 30, in South east Asia, and in Tropical and South Africa.

Flowers alternate inflated part of corolla tube longer than the base

1 *A. coromandiliana*

Flowers mostly opposite corolla tube linear, widened near the top

2 *A. intrusa*

1 *ASYSTASIA COROMANDILIANA*, Nees in Wall Pl As R. III 89 (1832). A more or less dull pubescent herb, 1 to 4 ft high. *Leaves* from 1 to 3.5 in long, ovate, triangular acute at tip entire, the margin undulate or sometimes obscurely toothed. *Petiole* .25 to 1.75 in long. *Racemes* 1 to 4 in long, rarely divided (paniculate), on a peduncle 1 to 4 in long. *Sepals* 2 in long, linear, pubescent. *Corolla* varying from lurid pale purple to nearly white 1 to 1.25 in long (see however, remark on form  $\beta$  below) the contracted cylindric base of the tube much shorter than its inflated upper half. *Pollen* 75 by 45  $\mu$ , with 2 stopples, and longitudinal ribs beside each stopple. *Capsule* 1 in long, solid cylindric base .35 in, seeds 2 in in diam, compressed, ovoid, wrinkled or subtubercular. Nees in DC Prodr XI 165 (with syn and var), Miq Fl Ind Bat II 792 Hook f Fl Br Ind IV 493 (with syn), Dyer Fl Trop Afr V 131, Fl Cap V 42. *A. gangetica*, Lindau in Engl & Prantl Pflanzenfam IV 33, 326, fig 131, Prain Beng Plants 813.

PENANG *Deschamps*, Waterfall, King, John, Scott. SINGAPORE *Deschamps*, T. Anderson, Hullett 67. — *DISTRIB* Indian Peninsula, Tropical and South Africa, elsewhere perhaps only a weed of cultivation.

There is no definite line between the examples of this species with small corolla (as John Scott's Penang example, with corolla only 75 in long and small leaves) and the *A. chelonoides*, Nees T Anderson called our present plant *A. gangetica*, while he has twice marked the Java *A. chelonoides* (with subcompound inflorescence) as *A. coromandeliana*.

2 *ASYSTASIA INTRUSA*, Blume Bijdr 796 (1825) (*excl syn*) A slender undershrub, 2 to 5 ft high, sparingly pubescent. Leaves 2 to 3 in long, elliptic lanceolate base obtriangular. Racemes 1 to 2 in long, flowers often opposite. Corolla 7 to 75 in long, dull pink, tube linear, widened only near the top. Capsule 75 in long, seeds 4, tubercular. Stamens, pollen, pistil, nearly as of *A. coromandeliana*. Morits Ver. Zoll Pfl 47 Hassk Cat Hort Bogor p 149 (*excl syn*), C B Clarke in Hook f Fl Br Ind IV 493, Ridley in Journ As Soc Straits 121 (Singapore 1900) *A. Blumei*, Nees in DC Prodr XI 167, Miq Fl Ind Bat II 793, Lindau in Engl & Prantl Pflanzenfam IV 3B, 326 *Isochoriste javanica*, Miq Fl Ind Bat II 822, Lindau in Engl & Prantl Pflanzenfam IV 3B 326.

PI NANG J Scott Deschamps Curtis 2741 Waterfall, Curtis 1853 3732 SINGAPORE Schomburgk 72 Hullett Ridley 3862 —  
DISTRIB Frequent throughout the Malay Archipelago

Nees altered the name of this plant because he says that there existed an earlier *Asystasia intrusa* of Forskahl. Forskahl's name however was *Luellia intrusa*.

## 20 PHIALACANTHUS, Benth

Calyx segments united into a tube at the base (very shortly so in *P. minor*). Inflorescence glabrous or very nearly so pedicels spreading, with nodding flowers. Capsule, where known (i.e. in *P. Wrayi*), supported by the hardened elongate calyx tube otherwise as *Filetia* —  
DISTRIB Species 4, viz the 3 below, and *P. Griffithii*, Benth, from East Assam

Calyx tube about as long as the teeth	Pollen with 12 raised strong longitudinal ribs	1 <i>P. Wrayi</i>
Calyx tube shorter than the teeth	Pollen with very obscure longitudinal ribs -	
Corolla 12 in long		2 <i>P. major</i>
Corolla 6 in long		3 <i>P. minor</i>

1 *PHIALACANTHUS WRAYI*, C B Clarke, n sp A branched nearly glabrous shrub, 2 to 3 ft high. Leaves opposite, equal, lamina 5 by 2 in, narrowed at either end, subentire tip acuminate, raphides obscure petiole 75 to 1 in long. Panicles 2 to 4 in long, terminal,

sometimes reduced to a simple raceme, bracts scarcely 1 in long, pedicels 0 to 2 in long, in opposite pairs *Calyx* in flower 25 to 35 in long, teeth triangular-lanceolate, acute calyx in fruit hardening, lengthening (up to 5 in and upwards) *Corolla* 1 in long and upwards, pale primrose (Wray) *Stamens* 4 filaments glabrous, united in pairs, anthers sub-equal, the two cells ellipsoid-oblong, at equal height, hardly auricled at the base, pollen 80 by 15  $\mu$ , with 2 stopples, and 12 strong raised ribs *Capsule* more than 1 in long, oblong-ellipsoid, smooth, 4-seeded in the upper half, retinacula large

PERAK Gunong Summit, alt 6700 ft, Wray 378

*P. Griffithii*, Benth, has pollen exactly as of *P. Wrayi*, and is closely allied to it, but has a much more open and compound inflorescence

2 *PHIALACANTHUS MAJOR*, C B Clarke, n sp A nearly glabrous shrub, 6 to 8 ft high *Leaves* opposite, equal, the blade up to 8 by 3 in, narrowed at each end petiole more than 1 in long *Panicles* 2 to 5 in long, terminal, sometimes reduced to a simple raceme, flowers opposite pedicels 175 in long, spreading, buds drooping *Calyx* nearly 35 in long, divided more than half way down teeth lanceolate *Corolla* 1.25 in long, waxy yellowish white *Stamens* nearly as of *P. Wrayi*, but the pollen only obscurely ribbed longitudinally *Pistil* as of *P. Wrayi*

PERAK *Scortechinii* 249, alt 2500 to 4000 ft, King's Collector 8146, 10929

3 *PHIALACANTHUS MINOR*, C B Clarke, n sp Very lil *P. major*, but smaller in every part *Leaves* smaller, sometimes only 3 by 7 in *Calyx* divided nearly to the base, 2 in long segments linear *Corolla* 8 in long

PERAK *Scortechinii*

## 21 *FILLTIA*, Miq

Herbs or small shrubs *Leaves* opposite, subequal, petioled, entire, with few or no raphides *Panicle* symmetrically terminal, frequently reduced nearly to a raceme or spike, pedicels largely opposite, bracts small, inconspicuous, except in *F. bracteosa* *Calyx* 175 to 25 in long, divided nearly to the base into 5 narrow segments *Corolla tube* linear or cylindric, conspicuously 2-lipped, posticous lip erect, subentire, anticus of 3 oblong lobes *Stamens* 4, perfect, subsimilar, anthers 2-celled, the cells oblong, muticous, one placed half-way below the other, or nearly at equal height, pollen short ellipsoid, with 2 stopples, and longitudinally striate *Pistil* glabrous, or hairy in the lower half of the style, ovules 2 in each cell, style shortly 2-fid, or with one

branch obsolete *Capsule* stalked, with 4 smooth, flat seeds in the clavate upper part (where known) — **DISTRIB** Species about 10, being those here described, the type *F. costulata* from Sumatra, *F. africana*, Lindau, and several from Borneo

We have 3 divisions of *Filetia* —

**Div 1 EUG. FILETIA** — *Corolla* tube linear 6 in long, palate glabrous Cells of the anthers quadrate, glabrous Pollen with longitudinal lines — *Filetia costulata*, Miq

**Div 2 PERAKIA** — *Corolla* tube 4 in long, cylindric, palate (usually densely) furred Cells of the anthers oblong or narrow oblong, the upper one fringed with hair Pollen with longitudinal latticed bands — Here belong the 4 species below described and some of Malaya

**Div 3 AFRO FILETIA** — *Corolla* tube 125 to 175 of an inch long palate glabrous Anther cells roundish the lower divaricate — Here belongs *Idetia africana*, Lindau

Panicle spreading Sepals small, acute, pubescent 1 *F. paniculata*

Panicle reduced to a raceme or spike Sepals glabrous, hardly acute —

Bracts ovate larger than the calyx .. 2 *F. bracteosa*

Bracts inconspicuous —

1 flower subsessile Leaves elliptic or subovate 3 1 *Scortechinii*

Flowers pedicelled Leaves oblong 4 1 *Isidleyi*

1 *FILETIA PANICULATA* C. B. Clarke, n. sp. Branches (seen) 8 to 12 in long, glabrate, woody below Leaves blade 4.5 by 2 in, elliptic narrowed at either end nearly glabrous nerves 8 to 10 pairs petioles 25 to 35 in long Inflorescence of 3 nearly simple racemes 2 to 4 in long floral leaves at base of inflorescence 5 in long, linear flowers mostly in opposite separate pairs on pedicels 125 in long bract at base of pedicel linear 125 to 175 in long Sepals 175 in long linear pubescent acute Corolla 7 in long yellowish densely hairy down the throat (*Scortechinii*) Pollen 70 by 40  $\mu$ , the longitudinal bands latticed Style hairy at base ovary nearly glabrous

**PERAK** *Scortechinii* 604

*Scortechinii* marked correctly his *Idetias* as now, genus next *Ipulagathus*

2 *FILETIA BRACIOBA* C. B. Clarke n. sp. Newly glabrous Leaves blade up to 9 by 3 to 3.5 in elliptic narrowed at either end, nerves 12 pairs petioles up to 7 in long Inflorescence a dense nearly simple spike 3 by 7 in flowers mostly in opposite pairs, nearly sessile the bract ovate or nearly round 2 in long Sepals 2 in long, linear ligulate, glabrous hardly acute Corolla and stamens nearly as of *F. paniculata* Style hairy in the lower half Capsule 1 in long, with 4 seeds in the upper half (resembling the capsule of *Eranthemum*)

**PERAK** *Scortechinii* (none of the 4 sheets numbered)

3 *FILETIA SCORTECHINII*, C B Clarke, n sp A much-branching nearly glabrous undershrub *Leaves* blade in the typical collections of Scortechinii 2.5 by 1 in., elliptic, rather oblique, nerves 5 to 6 pairs, petioles 0 to 2 in long in Wray 1505 the leaves are 4.5 by 1.75 in., obovate with cuneate base (see also var  $\beta$  below) *Inflorescence* a simple spike 2 to 3 in long, flowers subsessile, in opposite pairs, bract 1.25 to 1.75 in long, oblong *Sepals* 2.5 in long, linear-ligulate, glabrous, hardly acute *Corolla* 7 in long, white or pale yellow, furled in the throat but much less so than in *F. paniculata* *Stamens* and pollen as of *F. paniculata* *Style* slightly hairy at the base

PERAK *Scortechinii*, alt 4500 to 4900 ft, Wray 258, 1505

VAR  $\beta$  *evolutior* *Branches* elongate, with long internodes *Leaves* blade up to 5.5 by 2.25 in nerves 8 pairs, petiole up to 5 in long *Spike* elongate, loose, the lower pairs of flowers are far apart

PERAK *Scortechinii* 306

This may differ specifically, the flowers are exactly as of *F. Scortechinii* type

4 *FILETIA RIDLEYI* C B Clarke, n sp A much branched nearly glabrous undershrub *Leaves* 3 by 7.5 in, oblong, narrowed at each end margins undulate petioles 2.5 to 3.5 in long *Raceme* 2 to 3 in long, rather loose, with opposite pairs of pedicelled flowers, pedicels 1.25 to 1.75 in long bract oblong, shorter than the calyx *Sepals* 2 in long, linear-ligulate, subobtusely, glabrous *Corolla* 7 to 8 in long, white, shaped as of *F. paniculata* *Stamens* as of *F. paniculata*, the anther-cells rather narrower *Style* thinly clothed with long hite hairs *Capsule* 1 in long clavate the 4 seeds in the broadly obovate top

PERAK *Ridley* 9771

## 22 LIPIDAGAPHIS, Willd

Herbs or shrubs *Leaves* entire, undulate or crenate *Inflorescence* of spikes, or of panicles narrowed almost to spikes many flowered bracts secund, usually longer than the sepals, elliptic or narrow lanceolate, acute, prophylla smaller than the bracts *Calyx* divided nearly to the base into narrow lanceolate segments, whereof 2 are often larger 2 are sometimes connate at the base *Corolla tube* cylindric, limb 2 lipped, the 5 segments not very unequal *Stamens* 4, subsimilar, anther cells 2, parallel, oblong, often minutely mucronate at the base, at equal height or one slightly below the other pollen small, ellipsoid, with longitudinal rows of large patches *Stigma*, nearly entire *Capsule* small, 2 or 4 seeded, conic, hairy at top *Seeds* flattened, orbicular, hygroscopically hairy on the margin or nearly glabrate Species 60, in the hotter regions of the Old World, 2 in America

Lindau, in order to get *Lepidagathis* into a Tribe characterized by honeycombed pollen, advances the explanation that in *Lepidagathis* honeycomb bands are indicated by rows of points. I reckon honeycomb pollen to be globose without longitudinal bands and I do not esteem the pollen of *Lepidagathis* as honeycomb pollen.

Flowers 5 in long Spikes rarely up to 3 in long —

Leaves 3 to 5 in long Spikes 5 to 15 in long

1 *L. incurva*

Leaves 6 to 7 in long Spikes 2 to 3 in long .

2 *L. chlorostachya*

Flowers 1 to 1.3 in long Spikes 4 to 8 in long —

Upper bracts elliptic lanceolate Corolla pink purple, 1 in long

3 *L. longifolia*

Upper bracts linear Corolla white 1.3 in long

4 *L. macrantha*

1 *LEPIDAGATHIS INCURVA*, D Don Prodr Fl Nepal 119 (1825)  
*Stem* suberect 1 to 2 ft high, decumbent, rooting at base *Leaves* 3 to 5 in long, oblong, narrowed at each end, pubescent or nearly glabrate, margin often undulate *petiole* 5 in long *Spikes* 5 to 15 in long, oblong, axillary and terminal, erect, sessile, often clustered, ciliate, often softly hairy, bracts secund, nearly 5 in long, lanceolate, mucronate, prophylla nearly 35 in long, lanceolate, mucronate *Sepals* 5, narrow lanceolate, nearly 35 in long, unequal *Corolla* 25 in long, white with brown spots on the palate *Anther cells* one slightly below the other, often minutely tailed *Capsule* 2 in long, conic, hairy at top *Seeds* 4 flat, slightly hairy on the margin Kurz in Flora LIII 363 (1870) *L. hyalina*, Nees in Wall Pl As Rar III 95 (1832), and in DC Prodr XI 252 Miq Fl Ind Bat II 815 C B Clarke in Hook f Fl Br Ind IV 521 Hemsl in Journ Linn Soc XXVI 244 (1890), Lindau in Engl & Prantl Pflanzenfam IV 3 B, 313, Prain Beng Plants 815 *L. cephalotes*, O Kuntze Revisio I 492 *Ruellia dependens*, Roxb Fl Ind III 49 *Hypoestes cephalotes* Link Jahrb III 48

PENANG *Curtis* 2760, 3733, *Ridley* 2760, 7170, alt 100 to 200 ft *King's Collector* 1292 KEDAH *Ridley* 8319 — *DISTRIB* Common throughout India extending to China and Malaya

2 *LEPIDAGATHIS CHLOROSTACHYA* Nees in DC Prodr XI 256 (1847) *Leaves* 7 by 2.25 in, elliptic lanceolate, acuminate, attenuate at the base *Spikes* often 2 to 3 in long, broader than in *L. incurva*, otherwise as in *L. incurva* T Anders in Journ Linn Soc IX 496 (1867), C B Clarke in Hook f Fl Br Ind IV 519

PENANG Pulo Poongah, *Curtis* 2941 — *DISTRIB* Mergui, *Griffith* (K D) 6141

This is a much larger plant than *L. incurva*, the bracts are longer and the spikes manifestly broader but the corolla is hardly longer

3 *LEPIDAGATHIS LONGIFOLIA*, Wight Ic Pl Ind Or t 1564 (1850)

Shrubby, 3 to 6 ft high. Leaves up to 9 by 2 in, lanceolate, acuminate at either end, glabrous, petioles 7 in long. Panicles narrowed nearly to spikes, 6 to 8 in long, pubescent, bracts lax, 75 by 35 in, elliptic, apiculate. Sepals nearly 5 in long, lanceolate, unequal. Corolla "pink-purple" or "dull crimson," 1 in long, tube at top subcampanulate. Anther-cells at equal height, minutely mucronate at the base, pollen of the genus. Capsule seen only young, promises to be conic, small. T Anders in Journ Linn Soc IX 499 (1867), C B Clarke in Hook f Fl Br Ind IV 523, Ridley in Trans Linn Soc ser 2, III 332 (1893).

MALACCA Griffith (K D) 6138. Manngay (K D) 1751. Goodenough 1690. NFGRI SELMBILAN Muar, Fox 11283. PAHANG Ridley 2174. JOHORE Ridley 11127, Curtis. PERAK Scortechini 2038. Wray 1297, Goenong Panli, King's Collector 229 alt 300 to 500 ft. King's Collector 3025, 10040. KOJA GLANGGI and PULAU TAWAR fide Ridley, SILLAN GOR Curtis 2362. SINGGA Hullett 5718.

4 LEPIDAGATHIS MACRANTHA, C B Clarke, n sp. Bracts lanceolate at top, the upper nearly linear, 75 by 125 in. Corolla white, very pubescent without, 1.3 in long, otherwise as *L. longifolia*.

PERAK alt 300 ft, Wray 3385.

This may prove a variety only of *L. longifolia*, Wight, among the abundant collections of *L. longifolia* there is no specimen that matches *L. macrantha*.

### 23 BARLERIA Linn

Herbs or undershrubs, sometimes prickly. Leaves opposite or whorled, two of a whorl often reduced to spines. Inflorescence a terminal spike (in the Malay Peninsula plants), bract large, prophylla 2 or 0. Calyx large, of 4 distinct segments, 2 inner segments much the smaller. Corolla with a cylindric tube an inch or more long. Stamens 2, perfect, anther cells 2, at equal height, mucicous pollen globose, honeycombed. Ovary with 2 to 1 ovules in each cell, stigmas 2, short. Capsule ovoid, seeds 2 to 4, large, shaggy with hygroscopic hairs or nearly glabrate. Species 120, mostly in Africa and Tropical Asia, a few in America.

Leaves with interpetiolar spines. Corolla yellow.

1 *B. Prionitis*

Spineless. Corolla blue.

2 *B. conspicua*

1 BARLERIA PRIONITIS, Linn Sp Pl 636 (1753). Glabrous or nearly so. Stems 1 to 3 ft high. Leaves 2 to 5 by 3 to 1 in, elliptic, narrowed at both ends, mucronate, interpetiolar spines 25 to 75 in long. Inflorescence terminal, lower flowers of the spike often a little distant, flower-bract lanceolate, widened at the base,



posticous sepal nearly 5 in long, elliptic mucronate, anticus calyx-segment similar to the posticous sepal *Corolla* yellow, tube hardly 5 in long, posticous lip of 4 connate segments 7 in long, anticus lip clawed, shorter *Capsule* 5 to 7 in long, 2-seeded C B Clarke in Hook f Fl Br Ind IV 482 (*with syn*), Lindau in Engl & Prantl Pflanzenfam IV 3B, 314, tt 105c, 106B, 125E, Dyer Fl Cap V 46 (*with syn*), Prain Beng Plants 811, 812

MALACCA Griffith Ridley 2696, Harvey, Derry 271 DISTRIB Africa, India

This plant (with closely allied species) is abundant in Africa, and probably wild in Western India. In Eastern India it is cultivated and found near villages. It may not be wild at Malacca.

2 *BALEFRIA CONSPICUA*, Nees in Wull Pl As Rai III 92 (1832) *Leaves*, sparingly pubescent, without spines. *Leaves* 8 by 2 in, oblong, acuminate at either end. *Petioles* 5 in. *Spikes* 5 by nearly 1 in, loose, nearly continuous. *Bracteoles* present, 7 in long, linear oblong, minutely strigose. *Outer sepals* 7 in long, lanceolate, one bifid at the top, with some yellow hairs. *Corolla* 1 in long, blue. *Capsule* 75 in long, narrowly oblong glabrate 4 seeded. *Seeds* ultimately nearly glabrate. Nees in DC Prodr XI 226. T Anders in Journ Linn Soc IX 493 (1867). C B Clarke in Hook f Fl Br Ind IV 489. *Justicia conspua*, Wull Cat 2460.

PENANG Wallich

## 24 *CHRANTHEMUM*, R BROWN [Linn *partim*]

Undershrubs, some very small. *Leaves* opposite, equal or nearly so, petioled, entire, often undulate or obscurely crenulate, nearly glabrous, usually pubescent at least on the midrib beneath. *Panicles* narrow, or reduced to apparent spikes, terminal in the species of the Malay Peninsula. *Bracts* linear, inconspicuous, only in *E. caudifolium* so much as 25 in long. *Calyx* 125 to 2 in long (25 in long or more in *E. caudifolium*), divided to the base into linear segments, pubescent, ultimately often glabrate. *Corolla* showy, white or colorate, tube linear (except in *E. breviflos*) segments 5, quadrate elliptic, subequal, spreading, more or less one sided. *Stamens* 2, filaments very short, anthers in the mouth of the tube or just exsert, of 2 parallel oblong mucous cells placed at equal height. *Pollen* shortly ellipsoid or subglobose, with 2 stopples and 6 to 10 longitudinal bands, often obscure. *Ovary* with 2 ovules in each cell, style with 2 subequal minute lobes. *Capsule* with a linear-cylindric base, and 2 to 4 seeds in the much-widened upper half. *Seeds* ovoid flattened, glabrate, corrugate. — DISTRIB

Species 90 (after Mackaya has been taken out), mainly in South-east Asia and Oceania a dozen species in Tropical Africa with Madagascar, and a few in Tropical America

- Pistil clothed with brown hairs. Flowers 75 in long . 1 *E. hirtipistillum*  
 Pistil with a few patent thin hairs or glabrate —  
     Corolla tube 5 to 6 in long —  
         Spikes 3 to 6 in long, lower flowers solitary, distant 2 *E. porphyranthos*  
         Panicles 1 5 in long, of 6 to 12 small flowers 3 *E. breviflorus*  
         Panicles long, dense, flowers clustered or cymulose —  
             Sepals 125 to 25 in long leaf base attenuate 4 *E. caudifolium*  
             Sepals scarcely 125 in long, leaf base obtuse 5 *E. selangorinense*  
     Corolla tube 1 to 1.8 in long —  
         Panicle often reduced to an apparent spike —  
             Flowers white —  
                 Panicle of elongate interrupted spikes 6 *E. album*  
                 Spikes dense. Flowers clustered 8 *E. Kingii*  
             Flowers coloured —  
                 Flowers solitary all close in a continuous spike 7 *E. malaccense*  
                 Flowers in whorls the lower standing apart 9 *E. acuminatissimum*  
         Panicle with lower branches 175 in long carrying small cymes . 10 *E. Teysmannii*

1 *ERANTHEMUM HIRTIPISTILLUM*, C B Clarke, n sp. Erect, 2 ft high, pubescent. *Leaves* up to 8 by 3 in elliptic acuminate base sub obtuse, fuscous beneath pubescent on both surfaces, primary nerves 10 pairs petiole 15 in. *Inflorescence* of 3 to 1 panicles reduced to spikes, 4 to 9 in long flowers in clusters of 1 to 5, opposite, mostly 25 to 1 in apart bracts linear, 175 in long. *Sepals* 2 in, linear very pubescent. *Corolla* pale pink tube 5 in long lobes hardly 3 in long. *Stamens* and pollen of the genus the filaments and anthers slightly hairy. *Ovary* and style base clothed with erect brown hairs. *Capsule* nearly 1 in long, with 4 seeds in the hairy top, constricted between the pairs of seeds. *Seeds* of the genus.

PLBAK Wray 1399

2 *ERANTHEMUM PORPHYRANTHOS* C B Clarke, n sp. A sparingly hairy suberect simple stemmed undershrub, 1 to 2 ft high. *Leaves* very variable in size, blade sometimes 7 by 2.5 in, sometimes 2 by 7 in elliptic lanceolate acute base cuneate margin often undulate, sub crenulate, lower surface nearly glabrous or pubescent on the midrib, often when dry whitened. primary nerves 6 pairs petioles 25 to 3 in long. *Inflorescence* a linear spike, 3 to 6 in long (but see var  $\beta$ ) flowers sessile, in opposite pairs, the lower pairs 25 to 35 in (and upwards) distant bracts linear, hardly 175 in long. *Sepals* 15 in long linear, minutely pubescent. *Corolla* purple, or light purple, or white

tinged carnation" (Scortechini), tube 5 in long, linear, very slender, the upper 175 in widened, oblong, lobes elliptic, 35 in. long *Stamens* of the genus *Style* slightly hairy near the base *Capsule* 7 in long, with 4 seeds in the top, minutely pubescent, constricted between the pairs of seeds, seeds corrugated, subscabrous *E. crenulatum*, Nees in DC Prodr XI 453 (a partly) *E. malaccense*, C B Clarke in Hook. f Fl Br Ind IV 498 (partly)

PENANG Ridley, Deschamps, Curtis 499 MALACCA Cuming 2357 PERAK Scortechini 114, 543, 564, Larut Perak, alt 1000 to 1500 ft, King's Collector 3907

The very slender short tube of the corolla, having an oblong dilatation in the upper third of it, marks this species off from most *Eranthemums*

VAR  $\beta$  *evolutior*, C B Clarke Panicle of numerous elongate spikes with additional spikes from the leaf-axils, corolla-tube up to 7 in long  
PENANG Waterfall, Curtis 348

3 *ERANTHEMUM BREVIFLOUS*, C B Clarke, n sp A small, woody, crooked-stemmed, branched, nearly glabrous undershrub, 4 to 8 in high *Leaves* 4 by 175 in, elliptic, shortly narrowed at each end, nerves 6 pairs midrib beneath glabrate in the mature leaf, petioles 25 to 75 in long *Inflorescence* a panicle 15 in long, of 6 to 12 flowers, nearly glabrate, on a peduncle 5 in long, pedicels 0 to 175 in long, bracts minute, setaceous *Sepals* 125 in long, linear, when young minutely pubescent *Corolla* "grey", tube 25 in long, cylindric *Stamens* and pollen of *Eranthemum*, glabrous *Capsule* 8 to 9 in long, linear-oblong seeds 4, in the upper part, nearly smooth

PERAK Gopong, King's Collector 518

This plant appears closely allied in habit to *I. album*, the short cylindric corolla tube and linear conic capsule (not suddenly narrowed into a cylindric stalk) with smooth seeds suggest that it may belong to a different genus

4 *ERANTHEMUM CAUDIFOLIUM*, C B Clarke, n sp A shrub, 4 to 5 ft high, branched upwards, sparingly pubescent *Leaves* blade 75 by 25 in, elliptic, acuminate at either end, with a linear caudate tip (in Scortechini n 447), but in other examples leaves are seen narrower with a shorter tip, nerves 7 to 8 pairs, petioles of the lower leaves often 2 to 25 in long, of the upper only 25 in *Inflorescence* a narrow dense panicle 6 by 2 in, with brown pubescence, lateral branches hardly 2 in long, carrying small dense cymes, bracts 35 in long, linear, setaceous *Sepals* 175 to 25 in long, linear, caudate *Corolla* white (Curtis), tube 5 to 6 in long, often curved towards the top segments 2 in long *Stamens* of the genus *Pistil* and style

very thinly hairy. Capsule 1 in long, with 4 seeds in the upper part

PERAK *Scortechini* 447, 1531, *Curtis* 3150, 3341 DINDINGS  
*Ridley* 3066 bis

There are abundant collections and a detailed MS description of this plant by *Scortechini*. It is easily recognized by the small flowers with a large capsule some times more than an inch long

5 *ERANTHEMUM SELANGORENSE*, C B Clarke, n sp A branched shrub, minutely pubescent *Leaves* blade 5 to 6 by 2.5 in, elliptic acuminate, base obtuse or rounded *Panicle* 3 by 1 to 2 in, lower branches sometimes much developed, 1 in long, carrying 3 to 6 flowers *Sepals* scarcely 175 in long *Corolla-tube* 6 in long Otherwise as *E caudifolium*

SELANGOR Sungu Bulu, *Goodenough* 10547, Kwala Lumpor, *Curtis* 2367

6 *ERANTHEMUM ALBUM*, Nees in DC Prodr XI 455 (1847) A nearly glabrate undershrub, 1 to 3 ft high *Stem* usually lignescent, with white bark, to the very base of the inflorescence *Leaves* opposite, subequal, blade 5.5 by 2.5 in, shortly acuminate at either end, often whitened underneath, margins often obscurely undulate, crenulate, nerves 7 pairs, petioles 5 to 1 in long *Inflorescence* a panicle of many thin spikes, 4 to 8 in long (poor examples with one spike occur), flowers mostly solitary, in distant pairs, the lower 25 in apart or more, bracts linear, 175 in, pedicels 0 to 175 in (i.e., the spike is itself a contracted panicle) *Sepals* 175 in long, linear, minutely pubescent *Corolla* white tube 1 to 1.3 in long, linear, exactly the same width to the top *Stamens* and pistil glabrous, pollen subglobose, 30  $\mu$  in diam, lightly banded longitudinally *Capsule* 1 in long, glabrous or scarcely microscopically puberulous, 4-seeded near the top, slightly contracted between the pairs of seeds *Seeds* corrugated C B Clarke in Hook f Fl Br Ind IV 498, *Ridley* in Journ As Soc Straits 121 (Singapore 1900), *Prairie Beng Plants* 814 *E diversifolium*, Miq Fl Ind Bat II 837 *E crenulatum*, Nees in DC Prodr XI 453 Var  $\alpha$  (*partim*), 454, Var  $\gamma$  *angustifolia* (*partim*) *Justicia alba*, Roxb Fl Ind ed Carey & Wall I 117 (1820), Ic Ined 1105 in hb Kew *J orbiculata*, Wall Cat 2489b

MALACCA *Griffith* MALAY PENINSULA *Griffith* (K D) 6175 (*partly*)—DISTRIB Chittagong, Pegu, abundant in the Andamans and Nicobars, Malaya

Nees' type example of his *E Zollingerianum*, viz Zollinger 162 in Java lectus, is in Kew but is not this In the large examples the panicle has many long curved spikes,

the second flowers all turned to the convex side of the spike. The smaller forms (?), i.e. *J. orbiculata*, Wall., have a single straight spike

7 *ERANTHEMUM MALACCENSE*, C B Clarke in Hook f. Fl Br. Ind IV 498 (1884) (*tab et syn. excl*) *Innovations* pubescent *Stem* up to 4 to 5 ft. high, often branching. *Leaves* blade 5.5 by 1.25 in., lanceolate or narrow, elliptic-lanceolate, acute at either end, nerves 7 pairs, oblique, petioles .175 to .35 in long *Flowers* subsessile, numerous, close together in a spike nearly continuous to its base, mostly solitary, opposite, spikes 2 to 3 in long, one or several at the end of each branch, pedicels rarely up to .075 in long; bracts hardly longer than the pedicels *Sepals* about .075 in. long, narrow, pubescent. *Corolla* of one colour, variously noted as violet, purple, pink, pink-yellow, yellow-green, tube 1.125 in long, linear to the top *Stamens* of the genus *Psitt* with few patent thin hairs or subglabrate *Capsule* (in a Yunnan plant referred here) 7 in long, clavate, 4-seeded, very nearly glabrous Ridley in Trans Linn Soc, ser. 2, III 333 (1893) *E. erectum*, T Anders in Journ Agri-Hort Soc. Ind. new ser 1 286 (1868) *E. crenulatum* var *grandiflora*, T Anders l c *E. Blumei*, T Anders l c (non Nees) *E. crenulatum*, Nees in Wall Pl As Rar III 107 (*in large part*), and in DC Prodr XI 523 (*in part, not of* Lindley) *Pseuderanthemum malaccense*, Lindau in Engl & Prantl Pflanzenfam IV 3 B, 330

PROVINCE WELLESLEY *Curtis* 203, *Ridley* 2231. KEDAH Langkawi Island, *Curtis*, *Ridley* 8335 MALACCA common, fide *Ridley*, *Griffith* (K D) 6175, *Cunning* 2389, *Harvey*, *Goodenough* 1713, *Holmbury* 732, Mt Ophir, *Lobb* PERAK alt 500 ft, *King's Collector* 8567, 8626, 8665. *Curtis* 3327 PEKAN fide *Ridley* JOHORE *Curtis* DISTRIB SUM

This species, abundant in its area, is characterized by the uniform inflorescence, and is always collected in flower *E. palatiferum*, Bot Mag t 5957, of which (in Fl Br Ind IV 498) I referred one piece to *E. malaccense*, is undoubtedly all true *E. palatiferum*, of which it has the characteristic inflorescence, the colour of the flowers varies from pale pink to bluish purple in both species. The name *E. erectum*, T Anders, is older than *E. malaccense*, but was published without one word of description

8 *ERANTHEMUM KINGII*, C. B Clarke, n sp *Branches* elongate, with long internodes *Leaves* elliptic, shortly acuminate at the tip, hardly acuminate at the base, paler beneath when dry. *Spikes* solitary, 2 to 4 in long, dense, the lower axils with 1 to 3 flowers in each axil *Corolla* white, tube 1.125 in. long Otherwise as *E. malaccense*, C B Clarke

JOHORE Jaffaria, *King* SINGAPORE. *Hullett* 810.

The leaves of this species resemble those of *E. album* Nees while the spikes resemble those of *E. malaccense*, but are slightly more pubescent, and the corolla is white

9 *ERANTHEMUM ACUMINATISSIMUM* Miq Fl Ind Bat II 835 (1856) Erect, nearly glabrous *Leaves* blade 8.5 by 2 in., acuminate attenuate at either end, nerves 8 pair oblique raphides on the upper surface numerous, very short, petioles 1 in *Spikes* 1 to 3, 7 to 10 in long, many flowered, the lower clusters half whorled, 5 to 1 in apart, with 5 to 10 flowers to the whorl, the upper whorls fewer flowered, coalescent bracts 2 in long, lanceolate linear *Sepals* 2 in long, nearly linear, ultimately nearly glabrous *Corolla* white, with one segment purple spotted, tube 1.25 in long *Stamens* of the genus *Capsule* 1.125 in long, with 4 seeds in the upper part, slightly constricted between the seeds *E. Andersoni*, Masters in Gard Chron 134, 136 (1869) Bot Mag t 5771, C B Clarke in Hook f Fl Br Ind IV 499, Ridley in Trans Linn Soc, ser 2, III 333 (1893), and in Journ As Soc Straits 121 (Singapore 1900) *E. elegans*, Masters in Gard Chron 1231 (1868) (not of R Brown) *E. Blumei*, Hassk Cat Hort Bogori 151 T Anders in Journ Agri Hort Soc Ind new ser I 285 (1868) and in Journ Linn Soc IX 523 (1867) Kurz in Floru III 363 (1870) (not of Miquel) *E. dianthum* Blume Bijdr 793 (not of Roxb) *E. aspersum*, Hook Bot Mag 3711 *Pseudodanthium Andersoni*, Lindau in Engl & Prantl Pflanzenfam IV 31, 330

SINGAPORE *E. Andersoni* 112 JAVA cult in Hort Bogori (Kurz 379) Ridley, l.c., thinks the Singapore collection was probably a garden escape

The 'type' of *E. acuminatissimum*, Miquel from Utrecht proves identical with the *E. Andersoni*, Masters It was perhaps, *E. viscidum*  $\beta$  *acuminatissimum*, Hassk Hort Bogori p 151 but not *E. viscidum*  $\beta$  Blume The *E. Blumei*, Miq (Fl Ind. Bat II 836) is before me and very closely allied to *E. acuminatissimum*, but has (as Miquel says) smaller leaves, smaller bracts and smaller calyx

10 *ERANTHEMUM TEUSMANNI*, T Anders in Journ Agri Hort Soc Ind new ser I 285 (1868) "A shrubby creeper, 8 to 12 ft long" (Kings Collector) *Branches* 2.5 in in diam., with numerous secondary branches springing at a right angle *Leaves* blade 6 by 2 in., broad oblong, acuminate, nerves 6 pair, base often rounded or truncate, but on the same branch sometimes cuneate oblique, petioles 2.5 to 1.25 in long *Inflorescence* a narrow, many flowered panicle rarely so much as 6 in long, the lower branches hardly 1.75 in long, carrying small cymes (almost clusters) of flowers • *calyx* and *corolla* (white tinged blue) as of *E. acuminatissimum*, Miq *E. Blumei*, Hort Buitenzorg viz Miquel *E. crenulatum* 'var', T Anders MS

PERAK: *Scortechini* 1356, Tapa, alt. 2000 to 3000 ft., *Wray* 837; *King's Collector* 2176, Larut, alt. 5000 to 800 ft., *King's Collector* 5489  
MALACCA H D. 364

T. Anderson's whole diagnosis of his *E. Teysmanni* is "a fine species with a straggling habit"; and I have no authentic specimen; the name is disposable. Whether this was the imperfectly known *E. graciliflorum*, Nees (Wall. Pl. As. Rar V. 3, 107), from Penang I cannot say; it is not the *E. graciliflorum* of Madura (Java) distributed from the Buitenzorg Garden. This species resembles much *E. hirtipistillum* (collected at the same locality), but the corolla-tube is here 1·3 to 1·5 in. long.

## 25 CLINACANTHUS, Nees

A rambling shrub *Flowers* conspicuous, in small drooping cymes at the ends of the branches, bracts and prophylla small, linear *Sepals* 5, equal, linear *Corolla-tube* narrow, funnel-shaped, limb 2-lipped *Stamens* 2, anthers of 1 cell, oblong, nuticous, pollen ellipsoid, with 2 longitudinal bands *Style* very shortly 2-fid *Capsule* stalked, 4-seeded Only 1 species

1 CLINACANTHUS BURMANI, Nees in DC Prodr X 511 (1847)  
*Stems* round *Leaves* glabrate, blade 3 by ·5 to 8 in., elliptic-lanceolate or lanceolate, entire or crenate, base obtuse or attenuate, petiole 2½ in long *Cymes* pubescent, 5- to many-flowered, bracts 12½ in long *Sepals* ·25 in long, minutely hairy *Corolla* orange-red or dull scarlet, 1 2½ in. long, lobed one-third to half-way down *Stamens* glabrous, no rudiments *Style* glabrous Miq. Fl Ind Bai II 854, C B Clarke in Hook. f. Fl Br Ind IV. 524, Lindau in Engl & Prantl Pflanzenfam IV 3 B, 340, Hemsl in Journ. Linn Soc. XXVI 244 (1890) *C. nutans*, Lindau in Engl & Prantl Pflanzenfam IV 3 B, 340. *Justicia nutans*, Burm. Fl Ind 10, t 5, fig. 1 *J. fulgida*, Blume Bijdr. 784 *Belerophon* ? *fulgida*, Hassk Cat Hort. Bogor 151

MALACCA *Maingay* 1977 (K D 1180), Songkah, *Curtis* 2904 —  
DISTRIB Siam, Borneo, Hainan

## 26 JUSTICIA, Linn

Herbs or shrubs *Leaves* opposite, subequal or sometimes pseud-alternate, entire or undulate *Inflorescence* various in the different sections, from strobilate spikes to panicles with the flowers all pedicelled, bracts and prophylla small, linear, sometimes lanceolate, or in the strobilate spikes round, large, imbricate (these large round bracts in many cases cover more than one flower, and are then floral leaves). *Calyx* small, deeply 5-fid (4-fid in Sect. ROSTELLARIA) *Corolla-tube*

shorter (or scarcely longer) than the 2-lipped limb, segments imbricated (not twisted) in the bud Stamens 2, anther-cells 2, one below the other, tailed, pollen ellipsoid, small, longitudinally ribbed beside the stopples Ovary 4-celled, style shortly bifid Capsule regularly dehiscent, 4-seeded (the placentæ not springing elastically from the base of the capsule), stalked with the seeds in the top, or seed-bearing nearly from the base Seeds ovoid, flattened, verrucose, subtubercular, glabrous (except in Sect RHAPHIDOSPORA) — DISTRIBUTION Species 150, widely spread throughout the hot regions of the world

This genus is only artificially separated from several others (as from *Ieda* *Idhatoda*, *Ptyssiglottis*) by the white tail to the lower anther cell If this character be not regarded as of generic importance, the number of species may be 300, as in the arrangement by Lindau in Engl & Prantl Pflanzenfam

Sect 1 BRACTEATÆ Bracts (floral leaves) round, large, strobilate at least in the young spikes —

Flowers mostly solitary under each bract (floral leaf) —

Corolla glabrous without, except a few hairs at the tip .. 1 *J. ptychostoma*

Corolla hairy without —

Nerves of the leaves 6 to 7 pairs —

Leaves mostly cuneate at the base

2 *J. pubiflora*

Leaves rounded at the base

3 *J. Scottichinii*

Nerves of the leaves 10 to 11 pairs

3 *J. patulimerris*

Flowers 2 to 3 or more clustered under each bract —

Bracts 5 in long, including the petiole

5 *J. subcymosa*

Bracts 6 in long subsessile

6 *J. selangorensis*

Sect 2 CALOCHANOIDÆ Flowers axillary cymose solitary or clustered, without a terminal cyme or panicle Corolla small

Leaves opposite, subequal —

Leaves elliptic

7 *J. quadrijana*

Leaves linear oblong ..

8 *J. Neesiana*

Leaves apparently alternate, i.e. one of each pair 0 or minute, deciduous —

Leaves on the nerves beneath and stem nearly glabrous —

Herb, with long internodes

9 *J. hemisphylla*

Much branched shrub

10 *J. subalternans*

Leaves on the nerves beneath and stem hairy

11 *J. alternifolia*

Leaves one of each pair reduced to a persistent ear

12 *J. otophora*

Sect 3 GENDARUNSA Spikes terminal, and terminal on short axillary branches, bracts mostly narrow, the lowest rarely imbricate —

Leaves narrow oblong or lanceolate —

Spikes dense, flowers clustered

13 *J. Gendarussa*

Spikes lax, flowers mostly solitary

14 *J. Maingayi*

Leaves elliptic, large (5 to 8 in long) —

Peduncles short —

Spikes linear, interrupted

15 *J. vasculosa*



- Spikes dense .. 16 *J. uber*  
 Peduncles long, carrying panicles of linear spikes .. 17 *J. sumatrana*  
 Sect 4 ROSTIFOLIARIA Spikes cylindric bracts narrow, about as  
 long as the calyx Calyx of 4 linear segments, the 5th suppressed —  
 Corolla 25 to 35 in long .. 18 *J. procumbens*

*Justicia conspicua*, Dayd Jack Ind Kew, is a bare name, founded on Wall Cat n 2475 The 'type' of this came from Penang, but Wallich sorted with it, doubt fully, one plant from hb. Wight, another from Silhet. I have not found n 2475

1 JUSTICIA PTYCHOSTOMA, Nees in Wall Pl As Rar III 108 (1832)  
 A herb, very sparingly pubescent Stem 1 to 4 ft high, branching, internodes 3 to 6 in long Leaves 6.5 by 2.25 in, elliptic-lanceolate, acuminate at tip, cuneate at base (but see the Varieties below), often undulate or obscurely crenate on the margin, with very small rhaphides on both surfaces, primary nerves 7 to 9 pairs, oblique, petioles 5 to 1.5 in long, opposite pairs of leaves equal or rarely somewhat unequal Peduncles terminal, penultimate, or axillary, 1 to 2 in long, frequently 2 from one axil, spike 1 in long, or lengthening to 1 to 4 in long, bracts round, ovate, green, 3 to 3.5 in long, shortly stalked, very caducous, nearly glabrous, but often with white bristles on the margin, with 1 (rarely 1 to 2) flower under each bract Calyx 1.25 in long, nearly glabrous, segments linear Corolla lurid white yellow marked with purple grey lines corolla before expansion nearly 5 in long, glabrous without, or with a few hairs at the very tip Filaments glabrous anther cells round, one lower than the other with a short conic white tail, pollen small, ellipsoid, 30  $\mu$  long, with two stopples and two rows of tubercles (or round patches) on each side of the stopple Pistil glabrous, style very shortly 2-fid Capsule 5 in long, glabrate, 4 seeded Seeds flattened, verrucose, subtubercled T Anders in Journ Linn Soc IX 517 (1867), C B Clarke in Hook f Fl Br Ind 4 534 (emend) *Rhytidoglossa ptychostoma*, Nees in DC Prodr II 337 *R. ptychosperma*, Miq Fl Ind Bat II 825

PERAK *Scortechini* 689, Wray 2046, alt 100 ft, King's Collector 2077 PENANG Porter (Wall Cat 2478) KEDAH Curtis 2117

VAR  $\beta$  *angustifolia*, C B Clarke Leaves lanceolate or linear-lanceolate

PERAK alt 5000 ft, Gunong Inas, Wray 4130

VAR  $\gamma$  *rotundifolia*, C B Clarke Leaves 6 by 3.5 in, rounded at the base

PERAK Rudley 7163

VAR  $\delta$  *auriculata*, C B Clarke Leaves narrowly, unequally cordate at base, with two ears

PERAK alt 500 ft King's Collector 2062 *Scortechini*

This is a striking var, some of Scortechini's examples show on the same stem leaves acute at base and leaves auricled at base

VAR  $\epsilon$  *parvibracteata*, C B Clarke Spikes interrupted at base bracts very small, round, long-petioled, spreading, hardly (or not) imbricated

PERAK Ridley 7166, Goping, King's Collector 555

Wallich's (one) type sheet of this is very imperfect, as can be inferred from Nees' description, and my account in Hook f Fl Bt Ind is erroneous both as to the bracts and the synonymy

2 JUSTICIA PUBIFLORA, C B Clarke, n sp Leaves 4 to 6 in long, elliptic lanceolate, cuneate or rounded at the base nerves 6 pairs, rhabdides none (or most obscure) on either surface Peduncles terminal, and a few axillary, bracts (floral leaves) round-ovate green, 35 in long, shortly stalked, pubescent, without white bristles on the margin Calyx pubescent Corolla very hairy without Style at base slightly hairy Anther-cells short-ellipsoid, the lower with a medium ovoid tail pollen ellipsoid, pores 2 one longitudinal row of tubercles on either side of each pore Otherwise resembling *J. ptychostoma*, Wall

PERAK alt 4000 ft, King's Collector 3671 Scortechini

3 JUSTICIA PATULINERVIS, C B Clarke, n sp Sparingly pubescent Leaves 6 by 4 in, crenate, truncate at base, very shortly cuneate on the petiole nerves 10 to 11 pairs, spreading at right angles from the midrib Spike dense, bracts nearly glabrate, with some white bristles on the margin Corolla hairy without Otherwise as *J. pubiflora*

PERAK Scortechini

4 JUSTICIA SCORTECHINII, C B Clarke, n sp Leaves 3 to 4 in long, ovate or elliptic acuminate, most of them rounded at the base, crenulate, nerves 6 to 7 pairs, without rhabdides Spikes dense, bracts round-ovate, imbricate, somewhat pubescent, not bristle-ciliate Corolla hairy without Capsule hairy, nearly to the base Otherwise as *J. pubiflora*

PERAK Scortechini 41, 387

The leaves have dried a rich brown in all the nine sheets of Scortechini so that they look very unlike the preceding three species

5. JUSTICIA SUBCYMOSA, C B Clarke, n sp Stem 2 to 5 ft high Leaves ovate-acuminate, up to 9 by 5½ in, mostly obtuse at the base, nerves 11 pairs, petioles 1 to 2 in long Inflorescence up to 9 by 1 in, bracts 5 in long (petiole included), ovate, at first imbricated, in fruit often distant patent, a condensed cyme of 3 to 7 flowers under each floral leaf Sepals hardly 125 in long, pubescent Corolla pale

yellow, 5 in long, hairy without Capsule nearly 7 in long, hairy to the base Stamens and pistil nearly as of *J. ptychostoma*

PENANG (Curtis 1765) PERAK Scortechini, alt 500 to 1000 ft, King's Collector 5766, 10244 SELANGOR, Ridley 7593

A larger plant than the four preceding It has been supposed allied to *J. decussata*, Roxb., but the pseudo spikes do not branch

6 JUSTICIA SELANGORENSIS, C B Clarke, n sp Leaves 9 by  $4\frac{1}{2}$  in elliptic, shortly acuminate, rounded or cuneate at the base, dark purple (Ridley), nerves 9 to 10 pairs, oblique, petioles 2 to 4 in long Peduncles 75 in long spikes 4 by 1.25 in, slightly pubescent, bracts ovate or obovate, up to 6 in long, subsessile, glabrate, imbricate, purple (Ridley), with 2 or 3 flowers under each Calyx small, glabrate Corolla white (Ridley) Capsule hardly 35 in long, glabrate

SELANGOR Ridley 7587

I have seen no flowers This may be near the group of *J. burmanica* and *J. Atkinsonii*

7 JUSTICIA QUADRIFARIA, Wall Cat 2479 (1828-49) Branches 2 to 3 ft long, little divided, pubescent Leaves opposite, subequal, somewhat pubescent, at least on the midrib, blade elliptic 2 to 4 in long, acuminate at either end entire, petiole 0 to 35 in long Flowers densely clustered in the axils, sometimes in small heads on short axillary peduncles bracts (rather floral leaves) spatulate, rusty-pubescent, occasionally present Sepals 25 in long, linear, pubescent Corolla 25 to 35 in long white with rose spots Stamens 2, anther coils 2, one below the other, tailed style glabrous Capsule 25 in long, glabrate or minutely pubescent solid pedicel very short, seeds 4, verrucose-tubercular T Anders in Journ Linn Soc IX 514 (1867) C B Clarke in Hook f Fl Br Ind IV 530, Lindau in Engl & Pflanzl Pflanzenfam IV 38, 349, Heinsl in Journ Linn Soc XXVI 246 (1890) *J. Zollingeriana* C B Clarke, l c *Gendarussa quadrifaria*, Nees in Wall Pl As Rat III 105 *Adhatoda quadrifaria* and *Neesiana*, Nees in DC Prodr XI 396

SINGAPORE Hullett 156 SELANGOR (Curtis) — DISTRICT Khasia, Tenasserim, Sumatra, China

8 JUSTICIA NEESIANA, T Anders in Journ Linn Soc IX 513 (1867) Leaves oblong or linear lanceolate, 15 by 25 in in the type examples, but (in Wray 3538) attaining 4 by 75 in Sepals hardly 175 in Corolla 25 in long Otherwise as *J. quadrifaria*, Wall C B Clarke in Hook f Fl Br Ind IV 531 *Gendarussa Neesiana*, Wall Cat 7175 Nees in Wall Pl As Rat III 105 *Adhatoda Neesiana*, Nees in DC Prodr XI 397

PERAK *Scortechini* 38, 1304, alt 300 ft, Wray 3538 BUNGAL R  
Lobb —DISTRIB Amherst

*Scortechini*, n 38, and Lobb's example agree with the Wallichian Amherst plant Wray's example is much larger, and from description is not separable from *J. salicifolia*, F Anders (see Fl Br Ind IV 531) a Khasia plant which however it does not match As stated in the Fl Br Ind IV 530 *J. Neesiana* should be esteemed only a var of *J. quadrifaria*

9 JUSTICIA HENICOPHYLLA, C B Clarke, n sp A herb 1.5 to 4 ft high, nearly glabrous Leaves apparently alternate, attaining 9 by 3.5 in, often only half these dimensions, elliptic or ovate, acuminate, acute, base cuneate, not rarely unequal, with one side rounded or almost cordate primary nerves 7 pairs, petioles 0 to .25 in long In *florescence* of axillary peduncled cymes, sometimes small few flowered, sometimes compound 40 flowered (but less than half the length of the leaf), bracts and prophylla minute Sepals 5, linear, 1.75 in long, pubescent Corolla a greenish cream-colour the palate marked with rose purple, .35 in in length, pubescent without altogether as of a *Justicia* Stamens 2, filaments glabrous, cells of anthers 2, ellipsoid, one (half its length) below the other with a white tail pollen ellipsoid, 30  $\mu$  long, with 2 stopples, and a longitudinal row of patches on either side of each stopple Style hairy, shortly 2 fid at top Capsule 7 in long, glabrate, base cylindric, with 4 seeds in the upper (widened) part seeds glabrous granular scabrid

The numerous examples here collected may include more species than one, some (King's Collector 2189, Curtis 1342) have dried green, others (Wray and *Scortechini*) have dried red tinged black The leaves in some are shortly acuminate in others long acuminate The base of the leaf varies greatly on one branch

PERAK Curtis 1342, Wray 1402, 2751 *Scortechini* alt 500 ft  
King's Collector 2189, 10297

VAR  $\beta$  *caudata*, C B Clarke Leaves very unequal at the base the tip caudate, curved on one side

PERAK Goping, alt 500 to 800 ft, King's Collector 4349

VAR  $\gamma$  *scandens*, C B Clarke "A slender creeper, 20 to 25 ft high  
Leaves at the base nearly equal sided, cuneate

PERAK Goping, alt 300 to 500 ft, King's Collector 6058

10 JUSTICIA SUBALTERNANS, C B Clarke, n sp A much-branched shrub, 2 to 4 ft high, nearly glabrous Leaves opposite, rarely subequal, one of each pair often wanting or less than 1.25 in long nearly sessile, 1 sided, curved, shining, 4 by 1.25 in long, acuminate, acute, minutely scabrous on the midrib beneath Inflorescence of peduncled, axillary, short cymes Sepals 1.25 in long, lanceolate, pube

PENANG *Curtis* PAHANG *Ridley* 2183 SINGAPORE *Ridley* 3165 —DISTRIB Eastern India, plentiful, from Assam to Tenasserim, Sumatra

16 *JUSTICIA UBER*, C B Clarke, n sp Stem 3 to 4 ft high *Leaves* opposite, subequal, blade up to 10 by 3 to 4 in, elliptic or subovate, lanceolate acuminate at tip, cuneate at base, margin undulate, upper surface glabrate, lower paler, obscurely pubescent, raphides none or obscure, nerves 8 pairs, oblique, upper petioles 5 in long *Spikes* terminal and on axillary peduncles, sometimes paniced, dense, nearly always 1-sided, 1 to 3 by 5 in bract and prophylla 175 in long, narrow-lanceolate, nearly glabrate *Sepals* 175 in long, narrow lanceolate nearly glabrous *Corolla* greenish-yellow, 6 in long, somewhat hairy without *Stamens* 2, one anther-cell much below the other, with a white tail *Capsule* 6 in long, stalked, 4-seeded, glabrate *Seeds* flattened, verrucose, tubercled

PERAK *Scortechini* 96, 319, alt 400 to 700 ft, *Wray* 386, *King's Collector* 10245, *Ridley* 9773 SELANGOR *Ridley* 8216 .

This plant flowers and fruits freely, and there is more of it in the collections than of any other *Acanth* of the Malay Peninsula

17 *JUSTICIA SUMATRANA*, C B Clarke Nearly glabrous, the *inflorescence* minutely pubescent *Leaves* opposite, subequal, blade 6 by 3 in, broadly elliptic, entire, tip very shortly acuminate, base cuneate, nerves 7 to 8 pairs, petiole 35 in long *Peduncles* near the ends of the branches, 4 to 6 in long, each carrying a very lax panicle of thin linear spikes 2 to 4 in long, floral leaves 0, flowers solitary, minutely pedicelled opposite bract and prophylla minute *Sepals* 175 in long, lanceolate linear, viscous-scabrous *Corolla* greenish white with purple spots, 4 in long, minutely pubescent without *Stamens* 2, filaments glabrous, anther cells ellipsoid, one below the other, with a short conic white tail, pollen 25 by 15  $\mu$ , with longitudinal series of spots *Pistil* glabrate, except the base of the style *Capsule* 6 in long, nearly glabrous, 4-seeded in the upper part, seeds cerebrose-tubercular *Gendurussa* ? *sumatrana*, Miq Fl Ind Bat II 832

PERAK *Scortechini* 340, *Wray* 1596 —DISTRIB Sumatra (*Teysmann*)

This species is allied to *J. flaccida*, Kurz, but the petioles are not eared at base, the flowers are much smaller

18 *JUSTICIA PROCUMBENS*, Linn Sp Pl 15 (1753) Annual, much branched, decumbent or procumbent *Branches* slender, quadrangular *Leaves* elliptic or oblong, 1 to 2 in long, glabrous or hairy, short-

petioled *Spikes* cylindric, continuous, hirsute bracts linear-lanceolate 175 in long *Sepals* 4, linear, 175 in long, hirsute *Corolla* 25 to 35 in long, white pink-spotted *Stamens* 2 anthers 2-celled one cell below the other, tailed *Capsule* 25 in long, 4 seeded nearly from the base Benth Fl Austral IV 549, C B Clarke in Hook f Fl Br Ind IV 532, Lindau in Engl & Prantl Pflanzenfam IV 38, 349 Hemsl in Journ Linn Soc XXVI 246 (1890) *J. diffusa*, Prain Beng Plants 818 *Rostellaria procumbens*, Nees in Will Pl As Rar III 101 *Rostellularia procumbens*, Nees in DC Prodr XI 371 Moritz Veit Zoll Pf 47 Miq Fl Ind Bat II 826

PENANG Curtis 3099 —DISTRIB South India Australia

The group to which *J. procumbens* belongs may be esteemed to form but one species in which case its area would include all South and East Asia

## 27 ADHATODA Nees

*Spikes* strobilate the large bracts imbricated, green *Stamens* 2 anther cells 2, oblong, at nearly equal height, at the base subacute or with a minute knob, not tailed Otherwise as *Justicia* —DISTRIB Species, the present common one with which 6 or 8 other plants from Tropical Africa have been generically associated

This plant resembles altogether the bracteate section of *Justicia* with strobilate spikes except that the anther cells have not at their base the characteristic white anther tail

1 ADHATODA VASICA, Nees in Wall Pl As Rar III 103 (1832) A dense shrub 3 to 8 ft high *Leaves* 8 by 3 in, elliptic, acute at either end, entire, minutely pubescent petioles 1 in long *Peduncles* 1 to 6 in long, from the upper axils of the branches *Spikes* strobilate, 2 to 6 in long, bracts ovate green, entire 75 by 25 in prophylla up to 5 by 125 in *Sepals* 3 to 35 in long, lanceolate *Corolla* white, purple spotted, 125 in in total length tube short widened above the base *Capsule* 75 in long, stout, clavate, pubescent, with 4 rough seeds at the top C B Clarke in Hook f Fl Br Ind IV 540 (*with syn*), Prain Beng Plants 819 *Justicia Adhatoda*, Linn Sp Pl ed 1 15, ed 11 20 Lindau in Engl & Prantl Pflanzenfam IV 38, 349, Hemsl in Journ Linn Soc XXVI 244 (1890), Ridley in Journ As Soc Straits 122 (Singapore 1900) *Gendarussa Adhatoda*, Hassk Cat Hort Bog 151

PENANG Curtis 1017 SINGAPORE *vide* Hook f Fl Br Ind IV 540 —DISTRIB Throughout India, extending to Malaya, commonly cultivated

## 28 RHINACANTHUS, Nees

Erect or rambling herbs. *Leaves* entire, margins often undulate. *Flowers* in subsessile distant clusters on the branches of the panicle, bract and prophylla very small, linear. *Sepals* 5, linear, very small, hairy. *Corolla* 2-lipped, tube linear, longer than the lips, anticous lip patent, deeply 3 lobed, posticous lip narrowly oblong-linear, emarginate, curved and curled. *Stamens* 2, shortly exserted, anther-cells 2, one somewhat below the other, not tailed, pollen ellipsoid, longitudinally banded. *Ovary* hairy, ovules 2 in each cell stigma shortly subequally 2 lobed. *Capsule* with cylindric stalk, and 4 seeds in the top, placentæ not rising elastically. *Seeds* orbicular, flattened, black, pubescent.

DISTRIB. Species 3 or 4, in the warm parts of Africa and India.

1 RHINACANTHUS COMMUNIS, Nees in Wall Pl As Rar III 109 (1832). Hairy or nearly glabrous, 2 to 4 ft high. *Leaves* opposite, subequal, ovate to lanceolate, subobtusè, entire, 2 to 5 in long, narrowed to a petiole 0 to .35 in long. *Panicle* large, much branched, with small clusters of flowers on peduncles, sometimes very leafy, sometimes with few small floral leaves. bracts 125 to 25 in long. *Calyx* 125 to .25 in long. *Corolla* white tube 75 in long, linear to the top. *Capsule* 7 in long, hairy. Usually recognized by the curled linear oblong lip of the corolla. Hassk Cat Hort Bogori 151. Moitsi Verz Zoll Pf 48. Miq Fl Ind Bat II 833, C B Clarke in Dyer Fl Trop Afr V 224 (with syn.), Prain Beng Plants 819. *R. Nasuta*, Lindau in Engl & Prantl Pflanzenfam IV 3B, 339, t 135, fig F.

PLANG *Deschamps*, *Curtis* 2918. TONGKAL *Curtis* 2964. MALACCA *Griffith*.—DISTRIB. Common in the warm parts of Africa and South east Asia.

29 LIEBA, C B Clarke [*LEPTOSTACHYA*, Nees, *partim*]

Herbs. *Panicle* loose, branches long, linear, with distant flowers solitary or in clusters in the typical form, bracts inconspicuous. *Stamens* 2, anther-cells 2, the lower without a tail, at equal height parallel, or one lower somewhat divaricate, pollen ellipsoid, with 2 stopples, the longitudinal rows of patches on either side of each stopple prominent or obsolete. Otherwise as *Justicia*, Sect *Gendarussa*.—DISTRIB. Species 12, in South east Asia.

The seventy American species, among which stands *Dianthera*, Linn., differ greatly in habit among themselves and from the Indian. The genus *Dianthera* is sunk in *Justicia* by Lindau in Engl & Prantl Pflanzenfam IV 3B, 346, which then has three hundred species and is inconveniently large. But the Indian *Dianthera* only differs from *Justicia vasculosa*, Wallich, and its neighbours by the absence of a white tail to the lower anther cell.

Panicle very open, with long linear branches :—

Leaves rounded or sometimes cordate at base..	1	<i>L. subcordata</i> .
Leaves obovate, attenuate at base..	2	<i>L. obovata</i> .
Panicle almost dense, oblong, hardly 1 in broad	3	<i>L. densiflora</i>
Panicle reduced to two or three flowers	4	<i>L. radicans</i>
Terminal spikes simple, flowers solitary	5	<i>L. andrographioides</i> .

1 LEDA SUBCORDATA, C B Clarke, n sp Nearly glabrous, the innovations and inflorescence minutely pubescent Stem 1 to 2 ft long, divided, rambling, sometimes decumbent and rooting at the lower nodes (then with smaller leaves) Leaves opposite, subequal, blade 3·5 by 1·5 in, elliptic, acuminate, entire, base rounded or slightly cordate, petioles 1 in. long Panicles terminal on the slender branches, and with few distant subsolitary flowers, bracts and prophylla minute Sepals 125 in long, linear. Corolla white, 5 in long, tube straight, narrowly funnel-shaped Stamens 2, anther-cells 2, parallel, at equal height, rounded at base, pollen 45 by 30  $\mu$ , with 2 stopples and 2 longitudinal bands on either side each stopple Style glabrate

PERAK King's Collector 970, Scortechini 95, Curtis 3153

This species is close to the Kharia *L. debilis*, C B Clarke sub *Dianthera*, in which the flowers are in approximate, sessile, opposite pairs, forming long linear spikes

2 LEDA OBOVATA, C. B. Clarke, n sp Nearly glabrous, the inflorescence minutely pubescent Stem 1 foot or more Leaves opposite, subequal, blade 5·5 by 2·25 in obovate, with a very short acumination, entire, with many raphides, long decurrent at base, petiole hardly ·5 in. long Panicle terminal, long-peduncled, with few long linear branches, bracts and prophylla minute, the branches very narrow thinly flowered racemes, pedicels 0·6 in long, or occasionally 2 to 3 flowers clustered. Sepals 125 in long, linear, acute Corolla ("yellow" in Ridley's example) 5 in. long, tube straight, narrowly funnel-shaped Stamens 2, anther-cells 2, parallel, one placed at one-third of its length below the other, rounded at base, pollen ellipsoid with longitudinal bands. Capsule (young) 7 in long, with a linear stalk, pubescent

PERAK Scortechini (type of species). SELANGOR Ridley 7592 (an imperfect specimen, appears to match).

This species is near *Dianthera leptostachya*, Benth.

3. LEDA (?) DENSIFLORA, C B Clarke, n. sp Glabrous Stems 8 in long, decumbent at base. Leaves opposite, equal, some 5 by 1 in, lanceolate, some 5 by 1·5 in, elliptic-lanceolate, nerves 7 to 8 pair, patent, raphides many, small on both surfaces, margin undulate, base cuneate to a petiole 25 in long Inflorescence terminal, peduncle ·5 in long,



panicle 2 by 1 in, many-flowered, pedicels 0 to 1 in long, bracts and prophylla minute or 0. *Sepals* 0.6 in long, lanceolate, glabrous. *Corolla* 5 in long, yellow, straight, funnel-shaped, deeply 2-lipped. *Stamens* 2, filaments long, glabrous, anther-cells 2, oblong, parallel at equal height, obtuse at base, microscopically hairy, pollen ellipsoid, with 2 pores and 2 longitudinal lines of patches beside each stopple. *Capsule* 7.5 in long, slender, glabrous, with 4 seeds in the upper half.

PERAK *Ridley* 7165

This plant satisfies the technical characters of *Leda*, but the habit and inflorescence are those of *Fraxanthum*.

4 *LEDA RADICANS*, C. B. Clarke, n. sp. Creeping, rooting. *Stems* 10 in long, divided, minutely pubescent. *Leaves* opposite, equal, blade ovate, 1.5 in long, subentire, with many small raphides, rhomboid or nearly rounded at the base. *Petioles* 2.5 to 5 in long. *Inflorescence* terminal, depauperated, of 2 to 3 distant flowers. *Sepals* 1.25 to 1.75 in long, linear, somewhat pubescent. *Corolla* nearly 5 in long, as of *Dianthera*. *Stamens* 2, filaments glabrous, anther-cells 2, nearly at equal height, mucous, pollen short-ellipsoid, 25  $\mu$  long, with 2 stopples, obscurely marked longitudinally. *Pistil* glabrous.

PERAK Ulu Salamin, *Scortechini* 129

The material for this plant is scanty, and the genus doubtful.

5 *LEDA ANDROGRAPHIOIDES*, C. B. Clarke. Nearly glabrous. *Stems* about 1 ft high, weak. *Leaves* 3 in long, elliptic, acuminate, *Petioles* 2.5 to 5 in long. *Spikes* 2 to 3 in long, terminal, solitary, flowers solitary, opposite, in distant pairs. Bracts inconspicuous. *Sepals* 1.25 in long, linear lanceolate, nearly glabrous. *Corolla* 5 in long or rather more, tube cylindric, straight, lips short. One anther-cell below the other, with a minute callus at the base, hardly tailed. *Justicia andrographioides*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV 534, *Ridley* in Journ. As. Soc. Straits 121 (Singapore 1900).

SINGAPORE *Ridley*. DISTRICT Tenasserim

### 30 *POLYTREMA*, C. B. Clarke, n. gen.

Slender undershrubs. Opposite pairs of leaves equal or unequal. *Inflorescence* in small, few-flowered, axillary cymes, bracts inconspicuous. *Calyx*-lobes 5, linear. *Corolla* small, 2-lipped. *Stamens* 2, anther-cells 2, oblong, standing a little apart, one slightly below the other, having its base mucous or sometimes acute, not tailed. *Pollen* globose or obscurely trigonous-globose, without (or with very obscure) longitudinal bands, surface smooth or most minutely uniformly granu-

lar, stopples 4 in the typical species, possibly 4 to 3 in other species. *Capsule* stalked, with 4 seeds — *DISTRIB* Species the 3 here described and 1 in the Philippines

A group of species resembling in habit some of the Malay plants referred to *Ptysiglottis* by Hallier f in Nova Acta Leop Carol Acad 70 (1897) (as *P lan ceolata*, Hallier f l c 221, t 15, fig 1, or *P frutescens* Hallier f l c 222 t 16 fig 2), which have ellipsoid pollen longitudinally banded and anther cells approximated. The type *Ptysiglottis* from Ceylon is remote in habit and has approximated anther-cells

Leaves of opposite pairs (many of them) very unequal — •

Leaves entire, sepals 35 in long

1 *P vulgare*

Leaves finely crenulate, sepals 2 in long

2 *P crenulatum*

Leaves of opposite pairs equal or very nearly so

3 *P isophyllum*

1 *POLYTREMA VULGARE*, C B Clarke, n sp. Nearly glabrous branches round, somewhat zigzag. *Leaves* opposite, one reduced to an ovate auricle 25 to 5 in long, the other elliptic or broadly elliptic, 4 to 6 in long, entire, covered with small rhaphides. tip acuminate. base rhomboid not rounded, primary nerves 10 to 11 pair, petiole 0 to 175 in long. *Cymes* few-flowered, small, sessile or very nearly so in the axils, bracts and prophylla hardly any. *Sepals* 35 in long, setaceous, minutely pubescent or nearly glabrous. *Corolla* 7 in long, tube inflated in the upper half. *Stamens* 2, anther cells 2, mucicous, distant, one rather the lower. *Style* glabrous. *Capsule* 7 in long, glabrate, with 4 seeds in the upper part.

PERAK *Ridley* 7164, 9445, 9768 *Wray* 3591 (partly), Gopong, King's Collector 486. SFLANGOR *Ridley* 8545

2 *POLYTREMA CRENULATUM*, C B Clarke, n sp. Branches 6 to 8 in long, decumbent, much divided. *Leaves* up to 25 by 1 in subsessile, elliptic acuminate, margin finely crenulate. *Cymes* closely axillary 1 to 3 flowered. *Sepals* 2 in long, linear setaceous, nearly glabrous. *Corolla* 35 in long. Otherwise as *P vulgare*.

PERAK *Scootchini* (two collections without number)

This is possibly only a starved form of *P vulgare*, but it is considerably smaller in every part.

3 *POLYTREMA ISOPHYLLUM*, C B Clarke, n sp. Herb, 1 to 2 ft high, nearly glabrous. *Leaves* opposite, equal, yellow when dry, blade 4.5 by 1.75 in, elliptic-acuminate, base cuneate, entire, covered with rhaphides, primary nerves 7 to 8 pair, petioles 5 to 1 in long. *Cymes* small, few-flowered, closely axillary. *Sepals* 35 in long, setaceous, minutely pubescent. *Corolla* white, more than 5 in long. *Stamens* 2, filaments glabrous, anther-cells rather long, not tailed,

distant but nearly parallel, one (for one-third its length) below the other *Pistil* glabrous.

PERAK *Scortechini* 224

### 31 *ECBOLIUM*, KUNZ

*Spikes* strobilate, bracts imbricate, enclosing the calyx *Corolla*-tube linear *Stamens* 2, without rudiments, anther-cells 2, narrowly oblong, at equal height, muticous, pollen globose, with meridional bands *Capsule* stalked, with 4 large flat seeds in the round head Otherwise as *Justicia*—*DISTRIB* Species 12 in the warm parts of Africa, Madagascar, Arabia, and India

This genus resembles the section *Bracteata* of *Justicia*, which has similar strobilate spikes it differs in having the anther cells at equal height and without tails It is difficult to say by what character it differs from some of the American species of *Dianthera*, but the Malay *Dianthera* (*Leda*) have all very small bracts

1 *ECBOLIUM* LINNFANUM, KUNZ in Journ As Soc Bong XL ii 75 (1871). A small shrub, glabrate, the inflorescence somewhat pubescent *Leaves* opposite, equal, elliptic or obovate, acute, 3 to 6 in long base cuneate petiole 5 to 15 in *Spikes* strobilate 2 to 6 in long, terminal and on axillary peduncles, bracts ovate, 5 in long, green varying in their margin, which is sometimes serrate sometimes quite entire, rounded at the tip, prophylla 2, minute *Sepals* 2 in long narrow *Corolla* green blue, tube 75 to 1 in long, linear to the top lips 35 to 5 in long *Capsule* 75 in long, stalk narrowly cylindric head round, flat, 3 in in diam, containing 2 large, round, thin, rough seeds Boiss Fl Orient IV 526, Lindau in Engl & Prantl Pflanzenfam IV 3n, 338, C B Clarke in Hook f Fl Br Ind IV 544, and in Dyer Fl Trop Afr V 236 (*with syn*), Prain Beng Plants 816

PIRANG *King's Collector* 1671 MALACCA *Mairay* (H D) 1172 SINGAPORE *Deschamps* *DISTRIB* Common in warm Africa and India not yet known from the Malay Archipelago

Recognized by its green blue corolla, or by the broad head to the capsule

### 32 *GRAPTOPHYLLUM*, NEES

Glabrous shrubs *Leaves* equal, opposite, entire *Panicles* terminal, dense, oblong, bracts and prophylla very small *Corolla* large, red tube narrowly funnel-shaped, curved, otherwise nearly as *Ecobolium*—*DISTRIB* Species 3, whereof 1 is widely spread in the warm regions of the Old World, and 2 in Australia

The red corolla has a much broader tube than that of *Ecobolium* The much cultivated species here described is not confounded with *Ecobolium*, but is marked

sometimes *Justicia*, from which it differs by the anther-cells at equal height, not tailed.

1 GRAPTOPHYLLUM HORTENSE, Nees in Wall Pl As Rar III 102 (1832) Attains 6 to 8 ft in height *Leaves* broadly elliptic, 5 to 9 in. long, cuneate at either end, petiole hardly 25 in *Panicle* narrowed nearly to a raceme, terminal, subsessile, 10- to 40-flowered, bracts and prophylla inconspicuous *Sepals* .175 in long *Corolla* red, tube .75 in long, lips 5 in long Hassk. Cat Hort. Bogor 150, Moritz Verz. Zoll. Pfl. 47, Miq. Fl Ind Bat. II 824, C. B. Clarke in Hook f. Fl. Br. Ind IV 545, and in Dyer Fl Trop Afr V 241 (*with syn*) *G. pictum*, Griff. Notul IV. 139; Lindau in Engl & Prantl Pflanzenfam IV 3 B, 327.

PERAK *Scortechini* 1545 KEDAH *King's Collector* 1765. Wild probably in the Malay Archipelago, where it is plentiful Frequent in India, also in Guinea, where it is almost certainly introduced

### 33 PERISTROPHE, Nees

Erect branched herbs *Leaves* opposite, subequal, petioled *Flowers* 1 to 4 together, and of these one or more often imperfect, clustered between 2 floral leaves, the flower-clusters often peduncled, axillary or terminal, bract and prophylla to each flower small or 0. *Calyx* small, deeply lobed into 5 subequal lanceolate teeth *Corolla* rose or purple, tube slender, limb 2-lipped, upper lip subentire, lower subequally 3-lobed *Stamens* 2, filaments pubescent below, anther-cells 2, mucicous, narrow, curved, one half its length above the other, pollen short-ellipsoid, longitudinally banded. *Ovary* 4-ovulate, style filiform, minutely bifid *Capsule* ellipsoid, stalked, minutely pubescent, placentae not rising elastically from the base, seeds granular, subtubercular.—  
DISTRIB. Species 25, but several very close together, extending from Africa to Japan and New Caledonia.

Floral leaves ovate triangular, 5 in. broad; corolla 1.25 in. long	1. <i>P. tinctoria</i>
Floral leaves broadly lanceolate, .175 in. broad, corolla .75 in long	3 <i>P. salicifolia</i> .
Floral leaves linear-ligulate, .06 to .09 in. broad, corolla .75 to 1 in long	2 <i>P. acuminata</i>

These three species are very closely allied, as are all species admitted of this group by Nees and Miquel *P. montana*, Nees, *P. angustifolia*, Nees, *P. salicifolia*, Blume, *P. commutata*, Nees, are not improbably natives of the Malay Peninsula, but are included between *P. tinctoria* and *P. acuminata*

1 PERISTROPHE TINCTORIA, Nees in Wall. Pl As Rar. III 113 (1832) Often 3 to 4 ft high *Leaves* 3.5 by 1.75 in, cuneate at either end, entire, sparingly pubescent, petioles .25 to 1 in long *Peduncles*

25 to 1 in long, several often approximated, subpanicled, often glabrate *Floral leaves* ovate triangular, large, up to 1 by 5 in, margins not ciliate, but (more or less) minutely scabrid *Calyx* 175 to 2 in long, grey, hairy teeth lanceolate *Corolla* 125 in long *Anthers* 175 in long *Capsule* 6 in long C B Clarke in Hook f Fl Br Ind IV 556, Hemsl in Journ Linn Soc XXVI 248 (1890), Prain Beng Plants 820 *P pallida*, Nees in DC Prodr XI 494, Miq Fl Ind Bat II 846 Ridley in Trans Linn Soc ser 2, III 334 (1893)

JOHORL Ridley KRIAN *Scortechini* 1373 SINGAPORE *Scortechini* 370, 816 —DISTRIB Cultivated much in South east Asia

*P fera* C B Clarke in Hook f Fl Br Ind IV 556 is possibly the wild form of *P tinctoria* and hardly differs from it but by having the floral leaves ciliate on the margins This plant is (partly) described as *P tinctoria* by Nees and Miquel I have seen no example of it from the Malay Peninsula

2 *PIRISTROPHUM ACUMINATA* Nees in Wall Pl As Ru III 113 (1832) Similar than *P tinctoria* Nees in all its parts *Floral leaves* 6 by 06 to 09 in broad glabrous *Corolla* 75 to 1 in long *Capsule* 5 in long Nees in DC Prodr XI 496 T Anders in Journ Linn Soc LX 521 (1867) C B Clarke in Hook f Fl Br Ind IV 555 Lindau in Engl & Pflanzl Pflanzenfam IV 3B, 331 Ridley in Trans Linn Soc ser 2 III 334 (1893) and in Journ As Soc Straits 122 (Singapore 1900) *P Blumeana* Hassk Cit Hort Bogor 152, Nees in DC Prodr XI 495 Miq Fl Ind Bat II 848 *Justicia Rozburghiana*, Blume Bijdr 786, fide Miquel

PINANG *Deschamps* Curtis 681 PAHANG Ridley 1165 PERAK *Scortechini* 14 146 King's Collector 285 MALACCA Griffith Harvey Curtis 254 Goodenough SINGAPORE Hullett 93 PEKAN fide Ridley —DISTRIB Eastern India Burma, Java

3 *PIRISTROPHUM SALICIFOLIA* Miq Fl Ind Bat II 847 (1856) *Leaves* oblong lanceolate, often 3 by 5 in, rarely elliptic lanceolate often long acuminate *Floral leaves* 6 by 175 in (or broader) *Corolla* 75 in long *Capsule* 5 in long *Justicia salicifolia*, Blume Bijdr 787 *Hypoestes salicifolia*, O Kuntze Revisio I 491 (1891)

PINANG *Deschamps*, King's Collector, Ridley 9375 PERAK *Scortechini*, Wray 847 —DISTRIB Java

This species is separated here from *P acuminata* by the sole character of broader bracts, and I doubt its specific distinctness It is a curious coincidence that O Kuntze should have named his plant (which is at Kew) *salicifolia*, as he did not intend it to be Blume's *Justicia salicifolia*

## 34 HYPOESTES, R BROWN

Erect branched herbs or shrubs. *Leaves* opposite, subequal, petioled. *Flowers* paired, one of these often imperfect or wanting the two bracts connate (in the Malay species) into an obconic or cylindric involucre, prophylla to the lower bract inside the involucre usually longer than the calyx prophylla to the upper bract often 0, involucre often numerous, in heads, dense panicles or racemes. *Calyx* shorter than the involucre, deeply lobed, teeth 5, lanceolate. *Corolla* rose-purple tube linear, lips 2, narrow. *Stamens* 2, anthers of 1 cell, mucous, pollen ellipsoid, longitudinally striate. *Ovary* 4 ovulate style glabrate upwards, shortly bifid. *Capsule* oblong or ellipsoid, stalked, 4 seeded, placentæ not rising elastically from the base of the capsule, seeds glabrous, tuberculate-granular.—*DISTRIB* Species 40, mostly in Africa and Mascaronia, 8 species are described by Miquel from Malaya, but these 8 are so closely allied that they might be described as 2.

The genus *Hypoestes* abounds in the Malay Archipelago and the quantity of material from thence is very large. In India again, *Hypoestes* is frequent. But from the Malay Peninsula I have only seen one collection viz. Mangay 1176, here described.

1 *HYPOESTES MALACENSIS*, Wight Ic 1555 (before 1850). Pubescent, branched, 1 to 2 ft high. *Leaves* up to 3 by 8 in elliptic lanceolate, narrowed at either end, entire, petiole 5 in long. *Involucres* in axillary and terminal ovoid clusters 1 in long, involucre 8 in long, shortly conic at base, with 2 linear teeth. *Calyx* 25 in long, minutely thinly hairy. *Corolla* 75 in long. *Pollen* with 3 stopples. T Andors in Journ Linn Soc IX 522 (1867). C B Clarke in Hook f Fl Br Ind IV 558, Lindau in Engl & Plantl Pflanzentam IV 311, 333. *H. rosea*, Dene in Nouv Ann Mus III 381 (Paris 1834) (*non* Beauv.)

MALACCA (Griffith, Capt 1 C' Wight Mangay (K D) 1176).  
*DISTRIB* Malay Islands.

With this is united (in Fl Br Ind IV 558) the Malay Archipelago species *H. Decaisneana*, Nees, and *H. lariflora*, Nees, which differ very little.

## 35 RUNGIA, Nees

Small undershrubs or herbs. *Leaves* opposite, equal. *Flowers* in peduncled spikes, floral leaves sometimes stipulate, including two bracts, lower bract longer than the calyx, upper smaller, sterile, nearly always empty. *Sepals* 5, nearly separate, linear. *Corolla* small, 2-lipped, tube oblong, short, lobes imbricated in the bud. *Stamens* 2.

1 anther-cell below the other usually appendaged, pollen ellipsoid, longitudinally banded Ovary 4-ovulate, style at tip emarginate Capsule small, with 4 or 2 seeds, placentæ rising elastically with the seeds, from the base of the capsule, seeds glabrous, minutely tuberculate—DISTRIB Species 35, mainly in India, extending to China, Australia, and Africa

This genus can be separated from the small species of *Justicia* by the fruit

1 RUNGIA LAXIFLORA, C B Clarke Suberect, 3 ft high, nearly glabrous Leaves lamina 3.5 by 1.25 in, elliptic, narrowed at either end, petioles .25 to 1 in long Spikes 2 to 4 in long, linear, flexuose, very lax, the outer bracts often scarcely imbricated Bract (floral leaf) 9 mm long, narrow lanceolate, with scarious margins, the two prophylla lanceolate with scarious margins, the lower 3 in long, the upper sterile, smaller Sepals .275 in long, linear, glabrous Corolla 6 in long, "pale yellow, striped with light grey" (Collector's note) Stamens 2 lower anther cell smaller than the upper, with a white spur pollen 50  $\mu$  long, with 3 stopples Style glabrous, minutely hairy near the base Capsule .35 in long minutely hairy, placentæ rising elastically, seeds minutely tubercled ? *Justicia laxiflora*, Blume Bijdr 789

PLERAK Scortechni, Larút, alt 3000 ft, King's Collector 3676, alt 100 ft, King's Collector 1815 —DISTRIB Java (?)

*Justicia laxiflora*, Blume, has the filament "anther barbata" and could hardly be this It was Zollinger, n 1539 *pl. Monit. Veit Zoll Pf 47*, which I have not got But I believe I got the name *Rungia laxiflora* from a Java plant marked *Justicia laxiflora*, which passed through my hands

2 RUNGIA MINUIFLORA, C B Clarke, n sp Suberect, a branched herb, 9 in high Leaves blade 2 by .75 in, ovate-lanceolate, tip obtuse, nearly glabrous, attenuated at base petiole up to .5 in long Spikes linear, 1 to 1.25 in long, very lax, interrupted at base, flower-bract 1.25 in long, elliptic-obtuse, green, microscopically brown-hairy Corolla .2 in long Stamens 2, one anther cell a little below the other distinctly tailed Capsule .15 to .175 in long placentæ rising elastically from the valves, seeds brown, minutely tuberculated

KRDAH Lankawi Island, Curtis 3689

Family XCI —LABIATÆ.

[By D. PRIN ]

Herbs, less often shrubs, usually beset with oil-glands. *Stem* usually 4-angled. *Leaves* opposite or whorled, exstipulate. *Flowers* irregular, solitary, 2-nate or fascicled, axillary or in centrifugal spicate cymes which by union in pairs form false whorls. *Calyx* persistent, nearly regular, or variously 4- to 5-cleft, or 2-lipped. *Corolla* gamopetalous, hypogynous, limb 4- to 5-lobed, or 2-lipped and personate, the lobes imbricate in bud. *Stamens* attached to the corolla-tube, usually 4 didynamous, sometimes the upper pair imperfect, anther-cells divaricate or parallel, sometimes disjoined, sometimes confluent. *Disk* usually prominent, regular or irregular. *Ovary* free, composed of two 2-celled carpels, the cells of which are also free, style simple, inserted between the lobes of the ovary, the stigma usually 2-lobed, its arms often unequal, ovules in each cell solitary, erect, anatropous. *Fruit* of 4 dry or rarely fleshy 1-seeded nutlets, rarely one or more of these abortive, situated at the base of the calyx, scar of attachment usually basal, small, occasionally lateral or sublateral and larger. *Seeds* small, erect, without albumen, or albumen very scanty, radicle inferior.—**DISTRIB.** Species about 2800, mainly in North Temperate regions

Stamens 4, declinate —

Lowest corolla-lobe patent, flat or slightly concave, wide-based, calyx-limb 2-lipped, upper tooth much wider than the others; filaments free.—

Corolla-tube very short, not or slightly exserted, stigma

2-lobed .. .. . 1. OCIMUM

Corolla-tube long, usually far exserted, stigma entire or subentire .. .. . 2. ORTHOSIPHON.

Lowest corolla-lobe deflexed, saccate or cymbiform, narrow-based —

Calyx-limb uniform, teeth 5, subequal, lowest corolla-lobe thick-edged, deeply saccate, not much longer than the others, filaments free .. .. . 3. HAPTIS.

Calyx-limb 2-lipped, upper tooth often (not always) wider than the others, lowest corolla-lobe cymbiform, much longer than the others, its margin not thickened —

Filaments free beyond point of insertion on corolla-tube 4. PLECTRANTHUS

Filaments connate in a sheath round the style .. 5. COLPUS

Stamens not declinate, filaments free —

Stamens 4, erect or spreading, equal or subequal, calyx-limb uniform, teeth 5, subequal; corolla-lobes 4, flat, subequal —



Anthers 1 celled, filaments bearded —

Whorls glomerulate in stout, lax, usually interrupted spikes ..

6 *POGOSTEMON*

Whorls aggregated in slender, dense, continuous spikes

7 *DYSOPHYLLA*

Anthers 2 celled, cells parallel, filaments not bearded;

whorls sometimes terminal, usually axillary ..

8 *MENTHA*

Stamens ascending under upper lip of corolla, usually 4 didynamous, the anterior pair the longer, sometimes 2, one pair being imperfect, corolla 2 lipped —

Calyx limb distinctly 2 lipped —

Calyx-throat remaining open after flowering; tube without dorsal appendage, undivided in fruit and persistent. —

Stamens two pairs upper calyx lip 3 toothed ..

9 *CALAMINTHA*

Stamens one pair, with remote anther cells, upper calyx lip 3 toothed or entire .. ..

10. *SALVIA*

Calyx throat occluded after flowering, tube with a dorsal plate or pouch, 2 partite, the upper segment deciduous in fruit .. ..

11 *SCUTELLARIA*

Calyx limb uniform, or, if oblique, not 2 lipped, the teeth subequal —

Anthers dimorphic, cells of anterior longer pair dimidiate, 1 locular, of posterior shorter pair 2 locular, upper corolla lip short, flattish pubescent externally but not woolly, flowers medium, purplish, calyx teeth 5, subequal ..

12 *ANISOMALLIS*

Anthers uniform, upper corolla lip arched or hooded over stamens —

Calyx teeth 6 to 10, limb often oblique, upper corolla lip densely woolly externally —

Lower corolla lip shorter than upper flowers large yellow ..

13 *LEONOTIS*

Lower corolla lip longer than upper, flowers medium or small, white ..

14 *LEUCAS*

Calyx teeth 5, subequal limb uniform, upper corolla lip pubescent externally but not woolly —

Nutlets with a small basal or subbasal scar —

Nutlets dry, flowers medium —

Calyx teeth spinescent, flowers purplish, leaves deeply incised ..

15 *LEONURUS*

Calyx teeth herbaceous, flowers white or yellow, leaves not incised .. ..

16 *PARAPHLOMIS*

Nutlets fleshy flowers large, yellow or white ..

17 *GOMPHOSTEMMA*

Nutlets with a large lateral scar, flowers very small, yellow

18 *CYMARIA*

# 1 *OCIMUM*, Linn

Strongly scented herbs or undershrubs *Flowers* small, in 6- to 10-flowered whorls, spicate or racemose, pedicels recurved under the calyx, bracts small, caducous *Calyx* ovoid or campanulate, in fruit

deflexed, 2-lipped, upper lip broad, flat, decurrent lower usually with 4 slender teeth, the central pair exceeding the lateral *Corolla tube* short, not annulate within limb 2 lipped, lower lip declinate, entire, flat or nearly so, upper rather shorter than lower, subequally 4 fid *Stamens* 4, declinate, didynamous, exserted filaments free on the lower pair connate below, naked or the upper toothed or hairy below anther cells confluent *Disk* entire or 3 to 4-lobed *Style* 2 fid lobes subulate or flattened *Nutlets* smooth or subrugose, mucilaginous when moistened —**DISTRIB** Species about 60, throughout the Tropics

Pedicels equalling or exceeding the calyx, two lower calyx teeth

longer than the upper lip

..

1 *O. sanctum*

Pedicels much shorter than the calyx -

Lower calyx teeth longer than the upper lip

2 *O. Basilicum*

Lower calyx teeth shorter than the upper lip

3 *O. gratissimum*

1 *OCTUUM SANCTUM*, Linn Mant 85 (1767) An erect softly hairy, much branched herb 1 to 2 ft high *Stems* and branches usually purplish, often woody at the base *Leaves* opposite membranous, pubescent on both surfaces especially on the nerves and principally beneath elliptic oblong obtuse or acute base cuneate or truncate, entire the margin elsewhere entire or serrate 1 to 2 in long, 6 to 1.2 in wide petiole 5 to 1 in long slender pubescent *Flowers* in slender racemes or panicles, 6 to 8 in long of rather close whorls *Ovules* ovate acuminate, 12 in long, ciliate *Calyx* 12 in (in fruit 2 in) long pedicels longer than the calyx slender, 25 in long, pubescent lower lip of calyx longer than upper, its 4 teeth lanceolate similar below the central pair with long, slenderawn like upcurved tips, which project beyond the upper lip the lateral pair with short straight tips, upper lip wide obovate or suborbicular, reflexed, shortly apiculate *Corolla* 15 in long, purplish pink upper lip pubescent on the back *Filaments* exserted, slender the upper ones with a small boarded basal appendage *Nutlets* 0.5 in long wide ellipsoid, smooth, yellow with black markings Roxb Fl Ind III 14 Wall Cat 2716 Benth in DC Prodr XII 38, Miq Fl Ind Bat II 939 Hook f Fl Br Ind IV 609, Prain Beng Plants 843 *O. monachorum*, Linn Mant 85 *O. tenuiflorum*, Linn Sp Pl I 597 Benth in DC Prodr XII 39 *O. odoratum*, Burm Thes Zeylan 175, t 80, f 2

In most of the provinces, in waste places — **DISTRIB** South-east Asia from Arabia eastwards Australia Pacific Islands

This, the Sacred Tulsi of India, is no doubt an introduced plant in our area, where it is indigenous is uncertain

2 *OCIMUM BASILICUM*, Linn Sp Pl 597 (1753) An erect branching herb, 2 to 3 ft high. *Stems* and branches usually green, sometimes purplish, glabrous or more or less hispidly hairy. *Leaves* opposite, membranous, green or purplish, variously pubescent, in extreme forms quite glabrous, in others strongly hispidly hairy, ovate-acute, base cuneate, entire, margin elsewhere entire or toothed or occasionally (in cultivated forms) deeply lobed, 1 to 2 in long, 6 to 12 in wide, occasionally, in cultivated varieties, larger, petiole 5 to 1 in long. *Flowers* in rather dense racemes of whorls, the terminal raceme ultimately 6 to 8 in long, much exceeding the lateral, rarely (var *thyrsoides*) with all the racemes subequal, forming a terminal thyrse, bracts ovate acute, petiolate. *Calyx* 2 in (in fruit 35 in) long, pedicels very short, lower lip with central pair of teeth longer than the upper lip, which is orbicular, longer than the campanulate tube. *Corolla* 35 to 5 in long, variously white or pink or purplish, nearly or quite glabrous to pubescent or (var *ciliata*) hispidulous. *Filaments* shortly exserted, the upper ones with a tooth above the base. *Nutlets* 07 in long, ellipsoid, pitted. Wall Cat 2713, Hook f Fl Br Ind IV 608.

PERAK *Wayah*! PENANG *Walluh*! MALACCA Perhaps only cultivated in our area.—DISTRIBUTION Throughout Tropics of Eastern Hemisphere and Polynesia.

The presence of this species in Malacca is recorded by Sir J. D. Hooker (Fl Br Ind I c), but there are not now any Malacca specimens at Kew. In Penang it has only been collected by Wallich. His plant is a glabrous form never met with in India save in gardens. No complete specimens have been sent from Perak but Wayah records the species, under the name 'Ruku,' as an adulterant of Patchouli.

'Ruku' is however, the Malay name for *Hyptis graveolens*, which is one of the usual adulterants of Patchouli leaves, though the writer finds that samples of "Ruku" do contain, mixed with the leaves and calyxes of *Hyptis graveolens*, calyxes of *O. Basilicum*. The particular variety met with in these samples being var *pliosum*, there is just a possibility that in Perak this may sometimes occur as an escape from cultivation.

3 *OCIMUM GRATISSIMUM*, Linn Sp Pl 1197 (1753) A shrubby, much branched perennial, 4 to 6 ft high, woody at the base. *Stems* glabrous, young branches pubescent. *Leaves* opposite, chartaceous, pubescent, elliptic-lanceolate, acute, base cuneate, entire, margin elsewhere coarsely crenate-serrate, 25 to 5 in long, 15 to 25 in wide, petiole 1 to 25 in long, slender, pubescent. *Flowers* in simple or branched, strict, slender racemes, whorls rather close, rachis softly pubescent, bracts sessile, acuminate from a wide ovate base, exceeding the calyx, decussate and squarrose in young racemes. *Calyx* 12 in (in fruit 25 in) long, pubescent, glandular, pedicels very short, softly

pubescent, lower lip with central pair of teeth minute and much shorter than the upper lip, which is rounded and recurved. *Corolla* 17 in long, yellowish- or greenish-white, externally pubescent. *Filaments* distinctly exserted, upper pair with a bearded tooth at the base. *Nutlets* 0.6 in long, subglobose, rugose, brown. Roxb Fl Ind III 17, Wall Cat 2720, Hook f Fl Bt Ind IV 608.

PENANG. *Wallich*. Almost certainly only cultivated in our area —  
DISTRIB. Tropics generally, but doubtfully indigenous in America.

The only record of this species from our area is that of Wallich who collected specimens in Penang in 1822. Seeing that no one has sent it since from any of the provinces, it may almost certainly be concluded that Wallich's specimens came from cultivated plants or from casual escapes that have not become permanently established.

## 2. ORTHOSIPHON, Benth

Herbs, undershrubs, or shrubs. *Flowers* in 6 or fewer-flowered racemously arranged whorls, bracts small. *Calyx* 2-lipped, ovoid or campanulate tubular, deflexed in fruit. Lower lip 4-toothed, the central and lateral teeth distinct or shortly connate, usually subulate. Upper lip broad, membranous, the margins decurrent. *Corolla* 2-lipped, tube often slender straight or incurved. Lower lip entire, concave. Upper lip 3 to 4-lobed. *Stamens* 4, declinate, didynamous, included or exserted. Filaments free, not appendaged at base. Anther cells confluent. Disk usually gibbous. *Style* with a small capitate or clavate, entire or notched stigma. *Nutlets* dry, ovoid or globose, smooth or nearly so. — DISTRIB. Species about 60, in Tropics of the Old World.

ORTHOSIPHON SIAMENSIS, Benth in Wall Pl As. Rar. II 15 (1831). A slender glabrous or pubescent herb, 1 to 2 ft high, stems distinctly quadrangular. *Leaves* opposite, membranous, usually puberulous to pubescent on the nerves on both surfaces, otherwise glabrous, rather dark green above, ovate acuminate, with long entire cuneate base. Margin elsewhere coarsely wide serrate, 2 to 4 in long, 7.5 to 1.5 in wide, petiole 2.5 to 4 in long, puberulous or pubescent. *Flowers* in rather distant whorls, 6 in apart below, these arranged in lax terminal racemes 4 to 8 in long, 1.5 in across, not including the far-exserted filaments. *Calyx* 1.5 in (in fruit 2.5 in) long, campanulate, puberulous on the nerves, gland-dotted between, the two central teeth of lower lip subulate. *Corolla* uniformly finely puberulous, 1 in long, purplish or white, tube slender, straight, thrice as long as calyx, lower lip straight, 2 in long, upper lip refracted, 2 in long. *Filaments* glabrous, capillary, projecting 1.2 in beyond corolla-limb. *Nutlets* wide-oblong compressed, rugulose. Benth Lab. Gen. & Sp. 29, and in DC Prodr. XII.

52, Wall Cat 2727, Bot Mag t 5833, Miq Fl Ind Bat II 944, Hook f Fl Br Ind IV 615 *Ocimum grandiflorum*, Blume Bijdr 835 *O longiflorum*, Ham in Wall Cat l c

PERAK *Kunstler*! SINGAPORE *Deschamps*! NICOBARIS *Kurz*!—  
DISTRIB South-eastern Asia and Australia

### 3 HYPTIS, Jacq

Herbs or shrubs *Flowers* small or medium, very variously arranged, in our species arranged in dense capitate or lax secund heads, bracts subulate or setaceous *Calyx* 10 nerved, ovate or campanulate or tubular teeth 5 subequal, erect *Corolla* 5-lobed, lowest lobe abruptly deflexed, with thickened margin, saccate and contracted at the base the other lobes erect or spreading, flat *Stamens* 4, declinate, filaments free, without basal appendages anther cells confluent *Disk* entire, regular or somewhat gibbous in front *Style* with subentire or 2 fid stigma *Nutlets* oblong or ovoid, smooth or rugulose—*DISTRIB* Species about 250 all American, a few introduced and established in the Tropics of the Old World

Flowers in dense, globose axillary, many flowered heads

1 *H brevipes*

Flowers in lax secund, racemose few flowered heads

2 *H suaveolens*

1 *HYPTIS BREVIPES* Port Ann Mus Par VII 465 (1806) An erect annual herb, 2 to 3 ft high *Stems* glabrate or pilose *Leaves* opposite, membranous medium green and sparsely hispid throughout above paler and pubescent on the nerves beneath, ovate oblong or lanceolate apex acute, base long cuneate entire margin elsewhere serrate 2 to 3 in long, 75 to 1 in wide, petiole 25 to 5 in long *Flowers* in dense heads, 4 in in diam, on axillary, hispid, slender peduncles 4 to 5 in long, bracts ciliate, lanceolate or subulate, rigid, 2 in long *Calyx* subtubular, 1 in (in fruit 15 in) long, ciliate, teeth erect, subequal, subulate, as long as the tube *Corolla* 2 in long, tube slender *Nutlets* ovoid, brown, minutely rugulose Benth in DC Prodr XII 107 Miq Fl Ind Bat II 959, Hook f Fl Br Ind IV 630

MALACCA *Graffith* 3961! PENANG *King*! SINGAPORE *Kunstler*! PERAK *Scortechini*! ANDAMANS at Port Blair, *King*!—*DISTRIB* America, from Brazil to Mexico, Tropical Africa and the Malay Archipelago, introduced

*Hyptis capitata*, Jacq, a species in habit resembling *H brevipes*, is frequently met with in gardens in S E Asia It sometimes occurs spontaneously in waste places in India and appears to have become established in the Philippines and in Formosa The

possibility of its occurrence in our area should therefore be kept in mind. It is readily distinguished from *H. bracteata* by its much larger capitula, which reach 75 mm across, and by its calyx teeth being shorter than the tube. There is nothing in the description of the mysterious *Leucas globulifera* (Hassk. Cat. Hort. Bogor alt. 133), which finds a place in various works of reference and which is obviously not a *Leucas*, to prevent it from having been *Hyptis capitata* in cultivation, as Hasskail says, at Buitenzorg. Hasskail's small 2-lid upper lip may stand for the two upper corolla lobes, the lateral lobes of the lower lip being the two lateral corolla lobes, the concave mid lobe, largest of the three in what Hasskail terms the lower lip explains itself. Every other character agrees with *Hyptis capitata*, and the combination of characters will fit no other Labiate known to the writer as likely to be in cultivation in Java when Hasskail wrote.

2 *HYPTIS SUAVEOLENS*, Poit. Ann. Mus. Par. VII 472, t. 29, f. 2 (1806). A rigid, branching, annual herb, 2 to 4 ft. high. Stems hirsute. Leaves opposite, firmly herbaceous, dark green, pilose above, puberulent beneath, rather wide ovate, subacute, base rounded, truncate or slightly cuneate, rarely subcordate, margin sinuate and serrulate, 75 to 3 mm long, 6 to 2 mm wide, petiole slender, 35 to 75 mm long, sparingly pubescent. Flowers in lax, few-flowered, secund heads, 5 mm long, arranged racemously towards ends of branches in the axils of smaller leaves on pubescent peduncles 5 mm long, bracts minute, setaceous. Calyx campanulate, 2 mm (in fruit 35 mm) long, strongly ribbed, mouth villous, teeth erect, subulate, shorter than tube. Corolla blue, 3 mm long, tube slender. Nutlets narrowly oblong, brown, faintly rugose. Benth in DC. Prodr. XII 126. Miq. Fl. Ind. Bat. II 959. Hook. f. Fl. Bor. Ind. IV 630. *Ballota suaveolens*, Linn. Sp. Pl. 815. *Bystropogon suaveolens*, L'Hérit. Serot. Angl. 19. *B. graveolens*, Blume Bijdr. 824. *Scaevola graveolens*, Hassk. in Flora 1842, II Beibl. 25. Malay name "Ruku".

PERAK. Wray! MAJACCA. Maingay 2280! PINANG. Deschamps! NICHOLAS. Kunz 26063! DISTRIB. Tropical America introduced and widely spread in South-east Asia.

Leaves largely used, along with those of *Urena lobata*, Linn., in adulterating commercial samples of leaves of *Pogostemon Cablin*, the Patchouli plant principally cultivated in our area.

#### 4. *PITCHERIANIUS*, L'HÉRIT

Herbs or undershrubs. Flowers usually small, generally in lax panicle, 6- to 8-flowered cymes. Calyx 5-toothed, 2-lipped, enlarging in fruit. Corolla-tube exserted, long or short, decurved or straight, limb gibbous or sometimes spurred, less often straight, 2-lipped, lower

lip entire, long boat-shaped, upper short, 3- to 4-fid, recurved *Stamens* 4, declinate, filaments free, simple, anther cells usually confluent *Disk* usually produced anteriorly, there nearly to fully as long as the ovary *Style* usually 2 fid *Nutlets* orbicular or occasionally oblong or ovoid, smooth, granulate or punctate — **DISTRIB** Species about 100, in the Tropics of the Old World, Australia and Polynesia

**PLECTRANTHUS KUNSTLERI**, *Plum Jour As Soc Beng* LXVI ii 521 (1897) A stoutish shrubby plant, 2 to 5 ft high, everywhere finely puberulous *Leaves* opposite membranous, pale green especially beneath and there sparsely glandular puberulous darker and similarly faintly puberulous above, sometimes with a whitish line down the centre, ovate acute with entire, cuneate base and short, entire, subacuminate apex, margin elsewhere regularly crenate, 3 to 4.75 in long, 1.5 to 2 in wide petiole 1.5 to 2 in long *Flowers* in racemed cymes disposed in stout panicles with ascending branches, 6 in long 4 in across *Calyx* in fruit 2 in long gland dotted pedicels 1.5 in long, finely puberulous the two lower teeth subulate, the two lateral ovate acute longer than the upper orbicular ovate *Corolla* greenish white, or waxy white, faintly dotted, 4 in long, the tube decurved with a gibbous base, one and a half times as long as the boat shaped lower lip, upper lip rather short *Filaments* discrete from the point at which they are free from the corolla tube *Nutlets* oblong, brown, hardly shining *Ann Roy Bot Gard Cal* IX i 55, t 70

**PERAK** Kwala Dipong, 400 to 600 ft elev, *King's Collector (Kunstler)* 8240! Kinta, 800 to 1000 ft, *King's Collector (Kunstler)* 7143! On limestone ridges

##### 5. COLFUS LOUI

**Herbs** *Flowers* usually small generally in lax, paniculate 6 to 8 flowered cymes *Calyx* 5 toothed, 2 lipped, enlarging in fruit *Corolla tube* exserted, long or short, decurved or straight limb gibbous or less often straight 2 lipped, lower lip entire long boat shaped, upper short, 3 to 4 fid, recurved *Stamens* 4, declinate filaments combined below into a sheath around the style, anther cells usually confluent *Disk* usually produced anteriorly *Style* usually 2 fid *Nutlets* orbicular, oblong or ovoid, smooth, granulate or punctate — **DISTRIB** Species about 80 in the Tropics of the Old World and in Australia

**COLFUS ATROPURPUREUS**, Benth in Wall Pl As Rar II 16 (1831) A herb 2 to 3 ft high, everywhere finely pubescent *Leaves* opposite, membranous, dark-green above, rather closely puberulous on the nerves, elsewhere sparingly so, paler beneath and pubescent on the main and

secondary nerves ovate acute with entire rounded rarely cuneate base, and short entire blunt apex margins elsewhere rather widely crenate 2 to 4 in long, 1.25 to 1.75 in wide petiole 1 to 2 in long *Flowers* in irregularly branched cymes disposed in stoutish thyrses 3 to 6 in long 1.5 in across bracts ovate acute pubescent 1.5 in long deciduous *Calyx* in fruit 2 in long sparingly gland dotted pedicels 2 in long pubescent the two lower teeth subulate the two lateral oblong obtuse shorter than the upper ovate subacute *Corolla* blue and white 3 in long the tube abruptly decurved shorter than the lower lip upper lip very short *Filaments* connate far beyond point of attachment to corolla tube *Nutlets* orbiculate brown almost shining Benth Lab Gen & Spec 54 and in DC Prodr XII 74 Wall Cat 2733 Nunes Fl Philip t 208 Miq Fl Ind Bat II 951 Hook f II , Ind IV 626

In most of the Provinces **DISTRIB** Malay Archipelago Philippines Polynesia

#### 6. *POGOSTEMON* Desf

Herbs or undershrubs often strongly scented *Leaves* usually opposite *Flowers* small in simple or paniculate spikes or contracted racemes formed of many dense flowered subcapitate whorls *Calyx* almost equally 5 toothed *Corolla* 2 lipped upper lip 3 lobed the lobes subequal or the central one rather longer and narrower than the lateral ones the lower lip flat patent entire *Stamens* 4 exserted straight or declinate the lower pair rather shorter than the upper filaments bearded anther cells confluent *Disk* subentire uniform *Style* shortly 2 fid the arms subulate subequal *Nutlets* smooth ovoid or ellipsoid—**DISTRIB** Species about 30 throughout South eastern Asia

*Leaves* membranous sparingly puberulous or almost glabrous whorls separated by distinct interspaces throughout the spikes corolla glabrous externally except for a few hairs on margin of lower lip

1 1 *Heyneanus*

*Leaves* herbaceous densely pubescent, especially beneath whorls contiguous throughout the spikes or only the lowest separated by an interspace corolla uniformly pubescent externally

2 1 *Culin*

1 *POGOSTEMON HEYNEANUS* Benth in Wall Pl As Res 1 31 (1830)  
An erect branching herb 2 to 4 ft high *Stems* and branches slender sparsely pubescent *Leaves* opposite thinly membranous very sparingly puberulous or sometimes almost glabrous on both surfaces



medium-green above, pale green beneath, ovate acute, base wide-cuneate, entire, margin elsewhere crenate, each lobule again crenulate 2.5 to 4 in long, 1.5 to 2.75 in wide, petiole 1 to 1.5 in long, very sparingly puberulous. *Flowers* in slender, simple or paniculately branching terminal spikes 3 to 6 in long, whorls at the base 5 to 7.5 in apart, gradually more approximate upwards, but those near the apex still 2 to 1.5 in apart, whorls 4 in across, bracts elliptic, acute, sparingly puberulous, 1.5 in long or less. *Calyx* 1.5 in (in fruit 2 in) long, sparingly pubescent externally, teeth triangular, one third the length of the tube, equal and similar. *Corolla* 2 in long, glabrous externally save for a few hairs on margin of lower lip. *Filaments* exerted almost straight, all bearded. *Style arms* short, only one tenth to one eighth the length of the style. *Nutlets* wide ovate, .02 in long, dark brown with a pale base, smooth. Benth Lab Gen & Sp 154 and in DC Prodr XII 153. Wight Ic t 1440. Cooke Fl Bomb II 455. *P. Patchouli* Dalz & Gibs Bomb Fl Addend 66 (not *P. Patchouly* Pellet). *P. Patchouli* Hook f Fl Br Ind IV 633 (not *P. Patchouly*, Pellet).

SINGAPORE *G. Thomson*. MALACCA *Griffith* 3966<sup>1</sup>. SELANGOR Rawang, *Ridley* 7603<sup>1</sup>. Cultivated or as an escape from cultivation. DISTRIB India and Ceylon where, however, it is only known as a cultivated plant or as an escape from cultivation.

This the Indian 'Patchouli' if one may judge from the specimens communicated is the plant first introduced to our area on account of its peculiar scent. There is nothing to indicate whether it was formerly at all extensively cultivated; it does not appear to be so now.

2. *POGOSTEMON CABLIN* Benth in DC Prodr XII 156 (1848). An erect rather stout branching undershrub 2 to 5 ft high. *Stems* and branches stout, distinctly swollen under the nodes, densely hoary pubescent. *Leaves* opposite, herbaceous, closely densely pubescent on both surfaces, especially beneath, dark green above, medium green below, ovate acute, base shortly cuneate or subtruncate, entire, margin elsewhere usually deeply lobate, the lobes crenate, rarely margin simply crenate or in upper leaves almost entire, 3 to 4 in long, 2 to 3 in wide, petiole 1.5 to 2.5 in long, densely hoary pubescent. *Flowers* in stout simple spikes terminating the stem and the branches, 1.5 to 4 in long, the lowest whorl sometimes 5 to 6 in remote from the next, the rest or all the whorls closely aggregate, whorls 7.5 in across or more, bracts elliptic, acute, densely pubescent, 2 to 3.5 in long. *Calyx* 2 in (in fruit 2.5 in) long, densely pubescent, especially along the nerves, teeth triangular, one third the length of the tube,

equal and similar Corolla 3 in long, the throat and lips uniformly pubescent externally Filaments exserted, almost straight, all bearded Style-arms rather long, one-fifth to one-fourth the length of the style Nutlets not seen ripe P Patchouly, Pellet in Mem Soc Sc Orleans V 277, t 7 P suave, Ten in Giron Bot Ital II 56 P Patchouli, Hook Kew Journ Bot I 328, t 11 P Patchouli var suave, Hook f Fl Br Ind IV 634 Mentha Cablin, Blanco, Fl Filip 473 M auricularia, Blanco Fl Filip ed 2, 329 (not of Linn)

PERAK Wray! PENANG Wallich! Curtis! Cultivated only, in our area - DISTRIB Philippines, where, according to Lohr, it occurs only in gardens

This plant seems to flower not infrequently in the Philippines, there are specimens from thence at Kew collected both by Vidal and by Lohr So far as is known, it has flowered only three times in Europe once in France, recorded by Pelletier (1844), once in Italy, recorded by Tenore (1847), once in England, recorded by Sir W J Hooker (1849) Hooker's plant was obtained from Tenore No flowering specimen has ever been communicated from our area where according to Wray and Curtis, it is extensively cultivated by Chinese settlers In the Royal Botanic Garden at Calcutta the plant has been in continuous cultivation since 1834, when Wallich first obtained it from Penang, at Saharanpur, whence it was distributed from the Calcutta Garden, it has also been long in cultivation At Calcutta and at Saharanpur all attempts to induce the plant to flower have consistently failed

This, which may be termed the Malayan, as opposed to the original or Indian Patchouli, is not known to be cultivated anywhere in India except in botanical gardens

There are indications that a third kind of Patchouli plant the Chinese Patchouli (*Microtoena cymosa* Prain), had at one time been introduced not improbably by Chinese settlers to Java But its cultivation has not persisted in the Malayan Archipelago and there is no indication that it was ever introduced to the Peninsula The Chinese Patchouli seems at one time to have been cultivated to a considerable extent in North eastern India and to have competed in the Calcutta market with the Indian Patchouli (*Pogostemon Hyenensis*) Now however the Malayan Patchouli, the product of *Pogostemon Cablin* appears to have so completely supplanted both the others that neither are offered for sale, and the cultivation of *Pogostemon Hyenensis* is restricted to native gardens in the Indian Peninsula while that of *Microtoena cymosa* only lingers in a few native gardens in the Khasia Hills

In commercial samples of the leaves of *Pogostemon Cablin*, various extraneous leaves are to be met with The chief of these are leaves of *Hyptis suaveolens*, Poit, in our area known as "Ruku," also leaves of *Urena lobata*, Linn, known in our area as "Peipulut" With *Hyptis suaveolens*, and under the same name "Ruku," are associated the leaves of *Ocimum Basilicum* Linn, var *pilosum* These, however, are in much smaller quantity than those of the *Hyptis*

## 7 DYSOPHYLLA, Bl

Herbs *Leaves* opposite or whorled *Flowers* minute, in dense long spikes composed of numerous close set many-flowered cymes *Calyx* minute, ovoid, 5 toothed, teeth subequal, throat naked within *Corolla* minute, tube exerted or included, limb equally 4 fid, upper lobe entire or notched, lower spreading, *Stamens* 4, exerted, straight or nearly so filaments beaded, very long, anther-cells confluent *Disk* equal, subentire *Style* 2-fid *Nutlets* ovoid or oblong, smooth or granulate — **DISTRIB** Species about 15, in Tropics of Old World and Australia

DYSOPHYLLA AURICULARIA, Blume Bijdr 826 (1826) A coarse annual herb *Stems* laxly branched, rarely simple 1 to 2 ft high, pubescent with spreading hairs *Leaves* opposite, membranous, rather pale green, especially beneath, with numerous scattered hairs above and with similar hairs on the nerves beneath, ovate or oblong ovate, acute or rarely obtuse, with entire cuneate or rounded base, margins elsewhere coarsely serrate, 1 to 2.75 in long, .5 to 1 in wide, petiole 1 to 4 in long *Flowers* in villous cylindric terminal spikes 1.5 to 3 in long, 2 to 3.5 in in diam, whorls of cymes close set throughout *Calyx* in fruit 1 in long, subcampanulate, gland dotted, teeth subequal, triangular, incurved over the nutlets *Corolla* 1 in long, pinkish tube slender, much exerted, lobes short, pubescent *Filaments* exerted, densely villous *Nutlets* ellipsoid, almost smooth **Benth** Lab Gen & Sp 158, in DC Prodr XII 156, and in Wall Pl As Bat I 30, Wall Cat 1548, Wight Ic t 1445, Hook f Fl Br Ind IV 638 *Mentha auricularia*, Linn Mant 81 Roxb Fl Ind III 4, Griff Notul IV 200 *M. fatula*, Burin Fl Ind 126

In all the provinces — **DISTRIB** Throughout South east Asia

## 8 MENTHA, Linn

Strongly scented perennial herbs with creeping rootstocks *Flowers* small, in usually many-flowered terminal spikes or axillary whorls, bracts small or large *Calyx* tubular or campanulate, 10-ribbed, 5 toothed, teeth subequal *Corolla* tube infundibuliform, short, lobes 4, the uppermost rather wider than the other three, emarginate *Stamens* 4, usually dimorphic, subequal, filaments free, erect, distant, anthers 2 celled cells parallel *Disk* entire, uniform *Style-arm* short, subequal *Nutlets* ovoid, smooth or reticulate **DISTRIB** Species variously estimated—perhaps not more than 30 in reality—mainly in North Temperate regions, but some now widely dispersed in all parts of the world

MENTHA JAVANICA, Blume Bijdr 826 (1826) A prostrate herb, rooting

below. *Stems* 1 to 2 ft long, pubescent with reflexed adpressed hairs. *Leaves* opposite, membranous, highly hairy above, glabrous beneath, rather wide lanceolate, acute, base long-cuneate, entire, margin elsewhere serrate, 1 to 2 in long, 25 to 35 in wide, petiole 25 in long or shorter, floral leaves like those on the stem below the whorls. *Flowers* in axillary capitate distant whorls, bracts acute, shorter than the flowers. *Calyx* 1 in long, tubular-campanulate, adpressed-pubescent, teeth lanceolate, acute, longer than the tube. *Corolla* 15 in long, pubescent. Benth in DC Prodr XII 173. *M. satua*, Roxb Fl Ind III 6 (*hardly of Linn*). *M. arvensis*, Thw Enum Pl Zeyl 239 Trin Fl Ceyl III 381 (*hardly of Linn*). *M. arvensis* var *javanica*, Hook f Fl Br Ind IV 648.

MALACCA (*Griffith*)—DISTRIB Ceylon, Java, Philippines

Apparently rare and possibly an introduced plant in our area seeing that it has never been reported since Griffith met with it. As Sir J D Hooker remarks this which is Roxburgh's *M. satua*, may really be a form of *M. satua*, Linn and if so, may only be a state of *M. arvensis* Linn to which Boissier refers *M. satua*, and to which Thwaites refers the present plant. For the purposes of a local flora however it seems better to keep this form which is easily recognized apart as a distinct species.

#### 9. CALAMINTHA MARCH

Herbs or shrubs. *Flowers* small or medium in dense axillary or loose spicate or racemose or pinnated whorls. *Calyx* 13 nerved, 2 lipped lower lip 2 toothed teeth narrow upper lip 3 toothed, teeth wider and more highly connate throat naked or villous. *Corolla* tube straight, throat villous lower lip spreading, 3 lobed upper lip erect, flattish. *Stamens* 4, didynamous ascending under upper lip, the upper pair sometimes imperfect, anther cells parallel or divaricate. *Disk* uniform, entire. *Style* lobes equal or the upper smaller. *Nutlets* minute, subglobose, smooth.—DISTRIB Species about 40, in North Temperate regions.

*CALAMINTHA GRACILIS*, Benth in DC Prodr XII 232 (1848). A slender prostrate herb. *Stems* 8 to 12 in, faintly puberulous, rooting below. *Leaves* opposite, membranous, glabrous on both sides, dark green above, pale beneath, ovate-subacute, base rounded or shortly cuneate, entire, margin elsewhere serrate, 4 to 6 in long, 3 to 5 in wide, petiole 25 in long, puberulous. *Flowers* in lax many flowered whorls in axils of uppermost leaves, and there remote or aggregated in racemose or subcapitate terminal racemes, with rachis sparsely pubescent, bracteoles subulate, finely puberulous, half as long as slender pedicels. *Calyx* 12 in (in fruit 17 in) long, tube slightly inflated below, lower teeth subulate, ciliate incurved upper lip shortly 3-toothed, recurved, teeth

ovate pedicels 12 in long, puberulous Corolla 2 in long Nutlets 02 in, pale-brown, smooth

PERAK Thaiping, Ridley 11912!—DISTRIB Java, Assam

This species is not included in the 'Flora of British India' It was obtained by the late Mr C B Clarke, at Dibrugarh in Upper Assam, subsequent to the appearance of the account of the Indian species of this family by Sir Joseph Hooker

## 10 SALVIA, Linn

Herbs, undershrubs or shrubs Flowers small, medium, or large and showy, whorls usually in racemes or spikes, bracts small or large, sometimes coloured Calyx campanulate or tubular, 2 lipped, mouth naked, upper lip entire or 3 toothed, lower lip 2-fid Corolla 2-lipped tube naked or annulate within lower lip 3 lobed, the central lobe usually wider than the lateral, entire or emarginate upper lip erect Stamens 2, the upper pair imperfect represented by small staminodes or obsolete filaments short, articulating with a slender connective, and sometimes produced beyond the joint connective linear, transverse with an upper ascending arm which bears a linear fertile anther cell, and a lower straight or deflexed arm bearing a cell which may be empty or fertile or bearing no cell Disk usually enlarged anteriorly Style shortly 2 fid the lobes usually subulate, equal or the lower larger sometimes flattened Nutlets ovoid somewhat triquetrous smooth DISTRIB Species about 450, cosmopolitan

Flowers rather large showy corolla tube long far exserted	1 <i>S. coccinea</i>
Flowers minute inconspicuous corolla tube short, not exserted	2 <i>S. plebeia</i>

1 SALVIA COCCINEA, Juss ex Murr in Comm Gott I 86, t 1 (1778)  
A slender herb, 1 to 3 ft high Stems numerous, 4-angled, ascending, often branched, finely pubescent Leaves opposite, membranous, glabrous above, finely white pubescent beneath, dark green, ovate or cordate acute, crenate except the base, 1 to 1.5 in long, .75 to 1 in wide, petiole slender, finely puberulous, 6 to 8 in long Flowers in 6 to 10 flowered remote whorls disposed in terminal racemes, bracts ovate acuminate, deciduous, pedicels 12 in long, slender, puberulous Calyx 25 in (in fruit 35 in) long, pubescent, striate, narrowly campanulate upper lip entire, obtuse, lower 2-fid, the lobes acute Corolla 75 in long, red, tube straight, much exserted, widened upwards, lower lip spreading, 3 fid upper lip short, erect Nutlets .08 in long, very narrowly oblong, smooth, brown, shining Linn f Suppl 88, Benth in DC Prodr XII 343, Hook f Fl Br Ind IV 656 *S. Gerardiana*, Benth in Wall Cat 2150

SINGAPORE *Kurz*! MALACCA *Manqay* 1167! 1778! ANDAMANS Port Blair, *Kurz*!—DISTRIB America, where indigenous, Africa and South-east Asia, where generally cultivated and often as an escape from gardens

2 *SALVIA PLEBEIA*, R Br Prodr 501 (1810) An erect herb, 6 to 18 in high *Stems* obtusely 4-angled, grooved, hoary-pubescent *Leaves* opposite, membranous, sparsely hirsute or nearly glabrous, oblong-ob lanceolate, obtuse or subacute, base usually cuneate, entire margin elsewhere irregularly crenate, 2 to 4 in long, 75 to 175 in wide, petiole 1 to 2 in long *Flowers* in paniculate or subthyrsoid, interrupted, pubescent, spicate racemes, bracts small, linear spatulate, pedicels short *Calyx* 1 to 12 in (in fruit 18 to 2 in) long, campanulate, 2 lipped upper lip obtuse, entire lower 2 fid, the lobes acute or subacute *Corolla* small, 15 in long, whitish, lower lip 3 lobed, the mid-lobe exceeding the lateral ones upper lip oblong, obtuse *Nutlets* 04 in long, ovoid, smooth, brown Benth Lab Gen. & Sp 309, and in DC Prodr XII 355, Miq Fl Ind Bat II 970, Hook f Fl Br Ind IV 655 *S. brachyata*, Roxb Fl Ind I 145 Wall Cat 2149

MALACCA perhaps also in some of the other provinces —DISTRIB South-east Asia generally, Australia A very common Indian field weed, but in our area apparently extremely rare and perhaps only introduced

# 11 SCUTELLARIA, Linn

Herbs or undershrubs *Flowers* often in long narrow racemes *Calyx* campanulate, 2 lipped, lips closed in fruit, ultimately free to the base, the upper at length deciduous, with a deciduous dorsal scale or pouch, the lower persistent *Corolla* 2 lipped tube long, usually abruptly recurved beyond the calyx and ascending, dilated at the throat, not annulate within, lower lip wide, 3-lobed, the lateral lobes small and often connate with upper lip, which is erect, galeate, entire or notched *Stamens* 4, didynamous, the upper pair shorter, ascending under the hooded upper lip, anthers connivent, ciliate, those of upper stamens 2-celled, of lower 1 celled *Disk* elongate *Style* 2-fid, upper lobe very short *Nutlets* subglobose, smooth, granulate or hispidulous —DISTRIB Species about 90, mainly in the Northern Hemisphere

Pubescent, leaves purple beneath, corolla pale blue

1 *S. discolor*

Glabrous, leaves green beneath; corolla dark blue with white centre of lower lip

2 *S. andamanica*.

1 *SCUTILLARIA DISCOLOR*, Colebr in Wall Pl As Rai I 66 (1830)  
A slender pubescent herb. *Stems* ascending from a creeping rootstock,  
1 to 2 ft high, rarely branched, often naked above. *Leaves* opposite,  
and crowded towards the base of the stem, pubescent on both sides,  
often purple beneath, elliptic, obtuse base rounded or cordate, margin  
crenate, 1.5 to 4 in long, .75 to 2.5 in wide, petioles 1 to 3 in long.  
*Flowers* disposed in slender racemes 2 to 8 in long, rachis pubescent,  
bracts 1 to 15 in long pedicels 1 in long. *Calyx* 12 in (in fruit  
2 in) long, pubescent. *Corolla* pale blue, faintly puberulous externally,  
5 to 6 in long, tube 4 in long, throat somewhat dilated, lower lip  
3-lobed, upper lip galeate, obtuse. *Nutlets* .03 in long, scabrid.  
Benth in DC Prodr XII 417, Hook f Fl Br Ind IV 667  
*S. indica*, Blume Bijdr 839, Wall Cat 2134 (not of Linn.) *S. heteropoda*,  
Miq Fl Ind Bat II 972

PERAK *Scotchum* — *DISTRIB* India, Indo-China, Malay  
Archipelago

2 *SCUTILLARIA ANDAMANICA* Plam Journ As Soc Beng LIX ii  
307 (1890) A slender glabrous undershrub. *Stems* many from a  
woody rootstock with clustered rootlets 8 to 10 in high, simple or  
branched. *Leaves* opposite rather few, oblong lanceolate, obtuse  
base long cuneate, entire margin elsewhere crenate-dentate, 1.5 to  
1.75 in long, .4 to .6 in wide petiole 1 to 1.5 in long. *Flowers*  
opposite above, in whorls of three below, in slender racemes 3 to 4 in  
long bracts 12 in long pedicels 12 in long. *Calyx* 12 in (in fruit  
2 in) long, glabrous. *Corolla* blue, with centre of lower lip white  
.6 in long throat little dilated lower lip 3 lobed upper lip galeate  
*Nutlets* .04 in long, scabrid, pale brown. Ann Roy Bot Gard Cal  
IX i 56, t 71 A

ANDAMANS Port Blair, in stream beds, not uncommon

## 12 ANISOMILLS R. R.

Herbs, with tall coarse branching *stems*. *Flowers* medium, in  
axillary whorls or in lax branching paniculate cymes. *Calyx* ovoid or  
tubular straight, equally 5 toothed. *Corolla* tube short, annulate  
within lower lip 3 lobed, broad and patent, the mid-lobe retuse or  
notched upper lip entire, erect. *Stamens* exserted, anthers con-  
nivent, those of the lower and longer pair dimidiate, of the shorter  
upper pair 2 celled, the cells parallel, transverse. *Disk* equal. *Style*  
subequally 2 fid. *Nutlets* smooth. *DISTRIB* Species about 8, South-  
eastern Asiatic and Australian

Stems and branches acutely 4 angled, softly pubescent to glabrate, corolla pale purple, calyx teeth about as long as the tube

1 *A. ovata*

Stems and branches obtusely 4 angled densely white woolly, corolla dark purple, calyx teeth much shorter than the tube

2 *A. malabarica*

1 *ANISOMELIS OVATA*, R. Br. in Ait Hort Kew ed 2, III 364 (1811) A stoutish shrubby plant, with acutely 4 angled stems and branches, 2 to 5 ft high, sparingly hairy to densely pubescent or almost woolly. Leaves opposite, thickly herbaceous, uniformly hairy to woolly tomentose on both sides, rather pale green, ovate acute with entire truncate, rounded, or subcordate, less often shortly cuneate base, margin elsewhere crenate-seriate, 1.5 to 4 in long, 1 to 2.25 in wide, rarely rather larger low down on the stem, petiole 6 to 1.5 in long. Flowers in dense whorls, distant below, approximate above in a dense spicate inflorescence, in fruit the cymes sometimes subsecundly explanate bracts 1.5 to 2 in long, linear, beset with long firm hairs. Calyx 2.5 in (in fruit 3.5 in) long subsessile, hirsute with firm hairs, teeth lanceolate, acute, almost as long as tube hairy within and without, ciliate. Corolla 6 in long, light purple with blue lower lip, tube 2 in long, lower lip 4 lobed from deep division of the middle segment into two oblong lobes the lateral lobes small, rounded upper 2.5 in long, oblong, entire. Filaments hirsute. Nutlets 1 in long, wide ovate, subcompressed inner face bluntly angular, outer rounded, smooth, shining nearly black. Wall Cat 2040 Jacq Florig I t 86 Hook Bot Misc II 358, Suppl t 19 Benth in Wall Pl As nat 1 59, and in DC Prodr XII 455 Wight Ic t 865 Miq Pl Ind Bat II 975 Hook f Fl Br Ind IV 672 *A. disticha* Heyne in Roth Nov Sp 254 Roxb Fl Ind III 2 *A. glabrata* Benth in Wall Cat 2041 *A. mollissima*, Wall Cat 2039 *A. indica*, O Kuntze Rev Gen 512 *Nepeta indica*, Linn Sp Pl 571 *N. amboinica* Linn f Suppl 273 *N. disticha*, Blume Bijdr 823 *Ballota disticha*, Linn Mant 83 *B. mauritiana*, Pers Syn II 126 *Ajuga disticha*, Roxb Fl Ind III 2 *Marrubium indicum*, Burm Fl Ind 127 *M. odoratissimum*, Burm Thes Zeylan t 71, f 1 *Monarda zeylanica* Burm Fl Ind 12

In all the provinces, in waste places — DISSEMINATED South-eastern Asia generally, China

A very variable plant as regards tomentum, the extreme forms being *A. glabrata*, Benth, which is only sparsely hairy, and *A. mollissima*, Wall which is densely softly woolly pubescent. The two forms mentioned are probably deserving of separation as varieties intermediate states, however occur.



2 *ANISOMELES MALABARICA*, R Br in Bot Mag t 2071 (1819)  
 An erect shrubby plant, with obtusely 4-angled stems and branches, 4 to 6 ft high, densely tomentose or thickly woolly. Leaves opposite, very thickly herbaceous, pale-green above, white below, uniformly softly woolly tomentose, oblong-lanceolate, acute, with entire rounded or shortly cuneate base, margin elsewhere crenate-serrate, 2.5 to 4 in long, .75 to 1.75 in wide, petiole 5 in long, stout, softly woolly. Flowers in dense whorls, distant below, approximate above, often 1.25 in across, forming an interrupted spicate inflorescence, bracts 4 to 5 in long, linear, acute, densely softly woolly. Calyx 3 in (in fruit 4 in) long, subsessile, densely villous, teeth about half as long as tube, narrowly lanceolate, acute, villous externally and internally, ciliate. Corolla 8 in long, dark-purple, somewhat pubescent externally, tube .35 in long, lower lip 4 lobed from deep division of the middle segment into 2 oblong obtuse lobes, upper lip .35 in long, obtuse. Filaments pubescent. Nutlets 12 to 15 in long, ellipsoid, compressed, inner face faintly angled, outer rounded, smooth, shining, brown. Wall Cat 2037. Hook Journ Bot I 225, t 127, Wight Ic t 864, Benth in Wall Pl As Rar I 59, in Lab Gen & Sp 704, and in DC Prodr XII 456, Hook f Fl Br Ind IV 673. *A intermedia*, Wight in Benth Lab Gen & Sp 703. DC Prodr XII 456. *Nepeta malabarica*, Linn Mant 566. *Ajuga fruticosa*, Roxb Fl Ind III 1.

PENANG Wallich 2037. Ayer Etam, Tat's Corner, Curtis 3741.

DISTRIBUTION Drier parts of India and Ceylon. Mauritius, where it is probably an introduced species.

The fact that this plant is in our area confined, so far as is known to Penang, makes it not improbable that we have here to deal with an introduced species. It is a common and characteristic plant of the Deccan and of the drier region of Ceylon, but does not occur elsewhere in India.

### 13 *LEONOTIS*, R Br

Herbs or shrubs, usually tall and coarse. Flowers large, in many flowered axillary whorls, bracts numerous, slender. Calyx 10-nerved, tube often incurved, mouth oblique, with 8 to 10 rigid teeth, the uppermost longer than the rest. Corolla tube included or exserted, lower lip small, 3-lobed, the mid-lobe largest, upper lip long, concave, villous above. Stamens 4, didynamous, ascending under upper lip, lower pair longer, anthers connivent, the cells divaricate. Disk equal. Style subulate, with very short upper lobe. Nutlets obovoid or oblong or ovoid, truncate or rounded at the apex, glabrous.—DISTRIBUTION Species about 12, mostly confined to Africa, the present one occurring also in Asia and America, where probably it was originally introduced.

LEONOTIS NEPETIFOLIA, R Br in Ait Hort Kew ed 2, III 409 (1811) A tall erect annual herb, 4 to 7 ft high, with stout obtusely thickly 4-angled stems deeply furrowed between the angles, finely pubescent Leaves opposite, membranous, ovate acute base shortly cuneate and decurrent on the petiole, entire, margin elsewhere coarsely crenate-serrate, finely pubescent above and below, 2.5 to 6 in long, 1.5 to 4 in wide, petiole 1 to 4 in long, winged near apex Flowers in dense globose, axillary, many flowered whorls 1.5 to 2.5 in across, floral leaves lanceolate, deflexed, bracts linear, strongly spinescent at the apex, deflexed, pubescent, the longest 5 in long or longer Calyx 6 in (in fruit 7.5 in) long, tubular, incurved, strongly ribbed pubescent below, densely pubescent above, where also hispid with long white hairs, reticulately veined within, glabrous, teeth 8 to 9, unequal, the uppermost 3.5 in long, ovate-acute, much exceeding the triangular others, all with spinescent tips Corolla 1 in long, orange-scarlet, tube 5 in long, glabrous near base, densely beset above with orange scarlet pubescence, 3-annulate within with transverse bands of white hairs lower lip 1.5 to 2 in long, with 3 oblong obtuse lobes, the mesial rather the largest upper lip 5 in long densely villous with orange scarlet hairs Nutlets 15 in long, oblong obovoid, obliquely truncate and pitted at apex Benth in Wall Pl As Rai I 59, in Lab Gen & Sp 618, and in DC Prodr XII 535 Wall Cat 2042 Wight III II t 176 n, Wight Ic t 867 Bot Reg t 281, Bot Mag t 3700 Miq Fl Ind Bat II 984, Hook f Fl Br Ind IV 691 *Phlomis nepetifolia* Linn Sp Pl 586, Roxb Fl Ind III 8 (sph. *repetifolia*)

In some of the provinces, as an escape —DISTRIB Tropical Africa, where probably indigenous, but also widespread in South eastern Asia and occurring in Tropical America

#### 14. LUCAS, R Br

Herbs or undershrubs Flowers medium or small, in dense axillary, usually distant, less often terminal whorls Calyx 10-nerved, often striate, mouth equal or oblique, teeth 6 to 10, usually unequal Corolla tube not exerted, annulate or not within lower lip 3 fid, spreading, mid lobe large, upper lip erect, concave, villous externally Stamens 4, didynamous, the upper pair shorter, ascending under upper lip, anthers connivent, cells divaricate, ultimately confluent Disk entire or lobed, uniform or enlarged anteriorly Style subulate, upper lobe minute or obsolete Nutlets ovoid, triquetrous, obtuse —DISTRIB Species about 100, chiefly in Tropics of Old World

Whorls numerous, distant, axillary, calyx teeth long, slender, corolla small, tube not annulate within . . . 1 *I. martinicensis*

Whorls few, usually all or nearly all terminal, calyx teeth short, corolla medium, tube annulate within near the middle —

Whole plant sparingly beset with hispidulous hairs, calyx mouth obliquely campanulate, not contracted, teeth erect 2 *I. zeylanica*

Whole plant smooth, finely puberulous, calyx mouth projecting above in a large triangular lip, with the small teeth ascending along its margins, the mouth below forming a rounded sinus

3 *I. lavandulifolia*

1 *LEUCAS MARTINICENSIS*, R Br Prodr 504 (1810) A tall, stout, annual herb, 2 to 4 ft high, more or less branched. *Stem* and branches hirsute, 4 angled and 4-grooved, angles rounded. *Leaves* opposite, membranous, hirsute above and below, ovate, oblong or wide-lanceolate, obtuse, base cuneate, rarely rounded, entire, margin elsewhere widely and rather deeply crenate, 2.5 to 3.5 in long, 1 to 1.75 in wide, petiole hirsute, 4 to 7 in long. *Flowers* sessile, in numerous, distant, axillary, globose, many flowered whorls which are .75 to 1.25 in across, the floral leaves decreasing upwards, especially in width of blade and length of petiole. *Bracteoles* green, .25 to .35 in long, narrowly linear-lanceolate or subulate, spinescent at their tips with pale slender awns. *Calyx* 4 in (in fruit 6 in) long, tubular, sigmoid, pubescent externally, tube within glabrous and closely reticulate, mouth with a few short villi within, oblique. *Teeth* 10, all lanceolate, ciliate, with fine spinescent tips the uppermost largest, 2 in long the others alternately longer and shorter, 1 and 12 in long. *Corolla* white, small, .35 in long tube 2 in long, not annulate within lower lip spreading, the lateral lobes oblong rounded, wider than the oblong 2 fid central, upper lip erect, white villous. *Nutlets* 1 in long, obovoid-oblong, obliquely truncate at apex angular on inner face, rounded on outer, dark brown, shining. *Benth* in Wall Pl As Rar I 60, in Lab Gen & Sp 617, and in DC Prodr XII 533. *Miq* Fl Ind Bat II 983, *Hook* f Fl Br Ind IV 688. *L. polyccephala* Wall Cat 2051. *Phlomis martinicensis*, Sw Prodr Veg Ind Occ 88.

**PERAK** in waste places, *Scortechini*! — **DISTRIB** Tropical America, Tropical and South Africa, India and Indo China.

An introduced and as yet apparently a rare plant in our area.

2 *LEUCAS ZEYLANICA*, R Br Prodr 504 (1810) An erect annual herb, 6 to 20 in in height, simple or branched. *Stems* and branches 4 angled, hispidulous with scattered spreading hairs. *Leaves* opposite, decussate, membranous, dark-green above, uniformly but sparsely beset

with spreading hispidulous hairs, paler and subglaucescent beneath, with spreading hispidulous hairs on the nerves, the hairs on both sides curved towards leaf-apex, ovate lanceolate, or occasionally lanceolate, acute, base long-cuneate, entire, margin elsewhere entire or remotely and sparingly serrate, 1.5 to 3 in long, .25 to .5, rarely .75 in wide, petiole 1 to 2 in long, hispidulous. *Flowers* sessile or subsessile, in terminal usually 6 to 8 leaved whorls 5 to 7.5 in across, occasionally also axillary whorls occur below, bracts .25 in long, linear, spinescent, hispidulous along the margin with stiff spreading hairs. *Calyx* 2 in (in fruit 3 in) long, turbinate, slightly curved, the tube below glabrous or faintly pubescent externally, above beset with scattered, spreading, hispidulous hairs, the mouth subcampanulate, oblique, distinctly transversely veined between the 10 nerves, and sparingly pubescent within with short white hairs the uppermost of which project beyond the limb, teeth 8 the uppermost .05 in long, slightly longer than the others, all subulate, spinescent at the tip. *Corolla* white, medium, .5 in long, tube .25 in long, glabrous below, enlarged upwards where pubescent externally annulate within near the middle, lower lip patent, the mid lobe large, shortly widely clawed, the lateral lobes small, upper lip obovate, white-woolly. *Nutlets* 1.5 in long, obovoid-oblong, apex subtruncate, inner face angular, outer rounded dark brown or black, shining. Benth in Wall Pl As Rar I 60 in Lab Gen & Sp 614, and in DC Prodr XI 531 Wight III t 176 Hook f Fl Br Ind IV 689 *L. involucriata*, Benth in Wall Cat 2047 *L. dimidiata*, Benth in DC Prodr XII 532 (probably not of Spreng Syst II 743, *L. nutans*, Benth in Wall Pl As Rar I 60 (not of Spreng) Wall Cat 2523 (not of Spreng) *L. malayana*, Hance in Walp Ann III 269 *L. bancana*, Miq Fl Ind Bat Suppl 572, Hallier f Ann Jard Bot Buitenz XIII 293 *L. aspera*, Hook f Fl Br Ind IV 690 (in part not of Spreng) *Phlomis zeylanica*, Linn Sp Pl ed 2, 820 *Leonurus Marubastrium*, Burin Fl Ind 127 (not of Linn)

SINGAPORE in waste places, frequent, *G. Thomson*! *Kurz* 2906! *Deschamps*! MALACCA *Griffith*! — DISTRIB Throughout South eastern Asia

3 *ILUCAS LAVANDULIFOLIA*, Smith in Rees Cyclop XX n 2 (1819) An erect, slender, annual herb, 1 to 2 ft high, usually branching. *Stems* and branches 4-angled, finely adpressed puberulous. *Leaves* opposite, herbaceous, finely puberulous on both surfaces, rather pale green, linear lanceolate, less often lanceolate, subacute base tapering gradually from about the middle, entire, margin elsewhere entire in linear-lanceolate leaves, sometimes remotely and sparingly serrate in lanceolate ones, petiole usually very short or obsolete, rarely as much as .35 in long

*Flowers* subsessile or shortly pedicelled, in axillary and terminal but always leafy whorls, and always towards apex of stem and branches, 4 to 6 in across bracts 2 to 3 in long, narrowly linear, subspinescent, finely puberulous. *Calyx* 35 in (in fruit 45 in) long behind, 2 to 25 in long in front, sparingly puberulous or glabrous externally, tube curved, mouth pubescent within with adpressed white short hairs, contracted, very oblique, rounded below, and forming above a large acute lobe much produced forward and tipped by a minute spinescent tooth the remaining teeth variable in number, also minute, distant, erect along the oblique margin, usually 3, occasionally 4, sometimes only 2 on each side, with often a small tooth in the centre of the rounded sinus opposite the acute posterior lobe. *Corolla* white, medium, 5 in long, tube 25 in long, annulate within near the middle, lower lip patent, the mid-lobe large, obovate rounded, lateral lobes small, upper lip oblong, white woolly. *Nutlets* 12 in long oblong, rounded at apex inner face angular, outer rounded pale brown, dull. *L. linifolia*, Spreng Syst II 743 (1825) Wall Cat 2048, Benth in Wall Pl As Rur I 60, in Lab Gen & Sp 617, and in DC Prodr XII 533, Miq Fl Ind Bat II 983 Hook f Fl Br Ind IV 690 *Phlomis linifolia*, Roth Nov Sp 260 (1821) *P. zeylanica*, Roxb Fl Ind III 9, Jacq Ic Pl Rar I 11, t 111 (not of Linn) *Leonurus indicus*, Burm Fl Ind 127 *Herba admirationis*, Rumph Herb Amboin VI t 16, f 1

PENANG Penala Bukit, Curtis 1115! SINGAPORE in cultivated ground, G Thomson! Kunth 48! DISTRIB South eastern Asia generally, Mascarenes (Madagascar, Mauritius, Réunion Seychelles)

The calyx mouth of this species has been described in works of much authority as glabrous within, it is pubescent within

## 15 LEONURUS, Linn

Stout, erect, leafy herbs, with lobed leaves. *Flowers* small in densely congested, axillary distant whorls. *Calyx* turbinate, 5 nerved, with 5 spreading spinescent teeth. *Corolla* tube naked or annulate within, lower lip 3 fid, with obcordate mid-lobe, upper lip entire, erect. *Stamens* 4, didynamous, ascending under upper lip, lower pair longer, anthers connivent, the cells parallel, transverse. *Disk* uniform. *Style* equally 2-fid, the lobes obtuse or subulate. *Nutlets* smooth, dry, truncate at the apex.—DISTRIB Species 10, almost cosmopolitan

LEONURUS SIBIRICUS, Linn Sp Pl 584 (1753) A rather coarse annual herb, with obtusely 4 angled, furrowed, usually softly pubescent stems, 2 to 6 ft high. *Leaves* opposite, herbaceous, palmatipartite, with linear incised segments, dark-green and glabrous or nearly so

above, paler and more or less pubescent on the nerves beneath, 1.5 to 4 in long, 1 to 3 in wide, petiole 1 to 2 in long. *Flowers* in axillary whorls, the upper floral leaves usually entire, bracts 5 in long, spinescent. *Calyx* 2.5 in (in fruit 3.5 in) long, glabrous or sparingly pubescent, tube 2 in long, teeth spinescent from a shortly triangular base. *Corolla* 4 to 5 in long, red, tube 2.5 in long, annulate within, lower lip 3-lobed, mid-lobe obcordate, the lateral lobes rounded, upper lip obovate, galeate, entire, pubescent. *Filaments* exerted. *Nutlets* 1 in long, triquetrous, truncate. Wall Cat 2071, Benth in DC Prodr XII 501, Miq Fl Ind Bat II 978 Hook f Fl Br Ind IV 678 *L. tataricus*, Burm Fl Ind 127 Roxb Fl Ind III 8 (not of Linn.)

In some of the provinces, in waste places, an introduced weed of waysides and waste places.—**DISTRIB** Originally Asiatic now almost cosmopolitan.

Though described by Benth, and by Hooker *l.c.*, as not annulate the corolla tube of this species is distinctly annulate within. The annulus is slightly oblique rather higher anteriorly and is slightly imperfect there being a small hiatus behind where the style comes in contact with the corolla tube.

## 16 PARAPHILOMIS, Prain

Herbs or shrubs. *Leaves* membranous. *Flowers* medium, yellow or whitish, in dense axillary, many flowered whorls. bracteoles numerous, filiform. *Calyx* 10 nerved, equally 5 toothed, tube slightly incurved. *Corolla tube* annulate within. upper lip erect, pubescent externally, quite glabrous within, lower lip spreading, 3-lobed. *Stamens* 4, ascending under upper lip, lower pair longer. all filaments without basal appendages, anthers connivent, cells divaricate. *Disk* uniform, entire. *Style* 2 fid, lobes subequal or the upper shorter than lower. *Nutlets* obovoid, triquetrous below, rounded above, glabrous.—**DISTRIB** Species 3, two Malayan, one extending from the Eastern Himalaya to the Philippines.

**PARAPHILOMIS RUGOSA**, Prain in Ann Roy Bot Gard Calc IX : 60 (1901). A coarse shrubby plant, 2 to 3 ft high. *Stems* stout or slender, minutely hirsute with deflexed hairs. *Leaves* opposite, membranous, dark-green above, paler beneath, glabrous or with minute scattered hairs on the upper surface, elliptic or oblong-ovate, acuminate, base cuneate or truncate, entire, margin elsewhere shortly toothed, 6 to 8 in long, 3 to 4 in wide, petiole slender, 2 to 4 in long. *Flowers* in small distant or rather approximate whorls, axillary and

also often many on the stem below the leaves, 75 to 125 in across, bracteoles filiform, glabrescent, rather shorter than the calyx, 3 in long. *Calyx* 4 in (in fruit 5 in) long, obconic campanulate, tube slightly curved forwards, glabrous upwards where thickly membranous, usually hispid towards the coriaceous base. *teeth* 5 slender, lanceolate, from a triangular membranous base, two thirds the length of the tube, glabrous. *Corolla* pale yellow or white, 1 in long with a distinct annulus within both lips pubescent externally. lower 3 lobed with oblong mid lobe and lanceolate lateral lobes. upper narrow, rounded at apex, half the length of the tube, glabrous within. *Filaments* all devoid of basal appendages. *Style arms* subequal. *Nutlets* 25 in long obovoid acute below and triquetrous, rounded above, glabrous. *Phlomis rugosa*, Benth in Wall Cat 2067, in Wall Pl As Rar I 63, in Lab Gen & Sp 634 and in DC Prodr XII 545. Hook f Fl Br Ind IV 693. Plain Ann Roy Bot Gard Calc III 231. IX 1 60. *Gomphostemma membranifolium* Miq Pl Ind Bat II 988.

PIRAK Kintu, on limestone rocks, *King's Collector (Kunstler)* 7095. *Scortechini*. DISTRIBUTION Eastern Himalaya Indo China Malay Archipelago Philippines

The specific name applied to this plant by Mr Bentham is as Sir Joseph Hooker remarks wholly inapplicable. Its characters are so different from those of the genus *Phlomis* and its habit so unlike that of any member of that genus that it is necessary to consider it the type of a distinct genus.

## 17 GOMPHOSTEMMA, Wall

Coarse, stellately pubescent or tomentose perennial herbs or shrubs. *Roots* sometimes tuberous. *Flowers* large or medium, in 6 to 24 flowered whorls, sessile and densely or peduncled and laxly cymose. bracteoles lanceolate or linear. *Calyx* campanulate, 10 nerved subequally 5 toothed. *Corolla tube* slender throat inflated limb 2 lipped lower lip spreading, broadly 3 lobed. upper lip galeate, entire or emarginate. *Stamens* 4, pubescent, the lower longer, all ascending, anthers connivent in pairs, 2 locular, cells transverse, parallel. *Disk* subequal or gibbous behind. *Style* 2 fid, the lobes subulate, the anterior slightly the longer. *Nutlets* drupaceous, glabrous or pubescent, the pericarp usually fleshy and white, with a broad hilum, rarely all developed. DISTRIBUTION Species 26, South eastern Asiatic.

Corolla with almost straight tube and narrow throat, calyx tube hispidly hairy within, ovary glabrous, nutlets solitary glabrous (§ STENOSOMA) —

- Calyx-teeth triangular, much shorter than the tube; whorls few-flowered, densely congested; flowers yellow .. 1. *G. microcalyx*  
 Calyx-teeth linear-subulate, longer than the tube; whorls many-flowered, laxly cymose; flowers yellow .. 2. *G. crinitum*.  
 Corolla with distinctly incurved tube and wide-campanulate throat; nutlets 4 (§ EUGOMPHOSTEMMA) —  
 Calyx-tube hirsute within, ribbed, green; ovary villous; nutlets hispid at apex —  
     Corolla yellow; style hirsute; calyx-teeth longer than tube .. 3. *G. Scortechinii*  
     Corolla white; style usually glabrous; calyx-teeth not longer than tube .. 4. *G. oblongum*  
 Calyx-tube glabrous within, not ribbed, reddish, corolla white, nutlets quite glabrous, punctulate .. 5. *G. Curtium*.

Sect 1. STENOSTOMA, Prain *Corolla-tube* straight, glabrous within, longer than the calyx, the limb narrow, the lips small. *Nutlets* usually solitary, smooth.

1. GOMPHOSTEMMA MICROCALYX, Prain Journ As Soc. Beng LIX. ii 316 (1890). A coarse perennial herb, 3 to 5 ft high *Stems* stout, erect, sulcate, woody, hoary-pubescent or scabrid *Leaves* opposite, herbaceous, dark-green above, hoary beneath, finely closely stellate-pubescent on both surfaces, oblong-ovate, acute, base cuneate, entire, margin elsewhere entire or widely and minutely toothed, 4·5 to 6 in. long, 3 to 3·5 in wide, petiole of lower leaves 1·5 to 2 in., of upper leaves ·5 in long, scabrid. *Flowers* in dense, few-flowered whorls in the axils of the lower leaves and on the bare stem below the leaves, bracts ovate-lanceolate, entire, ·25 in. long, ·12 in wide. *Calyx* 3 in long, teeth short, triangular, less than half as long as the tube *Corolla* yellow, 1·25 in long, slightly puberulous externally, the throat very narrow *Style* and ovary glabrous *Nutlets* smooth, glabrous. Ann. Roy. Bot. Gard Calo III 251.

PERAK: Larút, 1800 to 2000 ft elev, *King's Collector* (Kunstler) 2155! *Scortechinii* 842! Wray 835! Ulu Buhong, *King's Collector* 10455!

Nearest to *G. parviflorum*, Wall., but with a much smaller calyx with diminutive teeth and a much narrower corolla *G. parviflorum*, though stated by Benthams, Miquel, and Hooker to occur in Penang, has never been met with in our area. The specimens on which the statement is based were collected by Wallich, who in 1828 issued them as the types (Lith. Cat. n. 2159-1) of his own species *G. crinitum*, to which they most undoubtedly belong. A year later Wallich referred these same specimens (as n. 2158-c) to his own *G. parviflorum*, this quite erroneous afterthought has been accepted by the three authors referred to.

2 GOMPHOSTEMMA CRINITUM, Wall Cat. 2159 (1828). A coarse perennial herb, 3 to 4 ft high *Stems* stout, erect, sulcate, woody,



hoary pubescent or scabrid *Leaves* opposite, herbaceous, dark-green, pubescent above, hoary beneath with a close stellate tomentum, or softly pubescent, elliptic-ovate or oblanceolate, acute base cuneate, entire margin elsewhere entire or serrate, 8 to 12 in long, 2.5 to 5 in wide petiole 5 to 1.5 in long, scabrid *Flowers* in rather lax, rarely condensed, many flowered axillary cymes bracts lanceolate, ovate lanceolate or linear, 5 to 7.5 in long *Calyx* 7 to 7.5 in long, teeth long, linear subulate, considerably longer than the tube *Corolla* yellow, 1.25 in long, slightly puberulous externally, the throat narrow *Style* and ovary glabrous *Nutlets* smooth, glabrous

VAR *typica* Bracts all lanceolate acute or linear, almost as long as the calyx leaves closely tomentose beneath, petioles 1.5 in long & *cristatum*, Wall Cat (*uti supra*) Benth in Wall Pl As Rar II 12, in Lab Gen & Sp 648 and in DC Prodr XII 552 Miq Fl Ind Bat II 987 Hook f Fl Br Ind IV 698 (*partly*), Plain Ann Roy Bot Gard Calc III 254 & *parviflorum*, Benth Lab Gen & Sp 648, and in DC Prodr XII 551 Miq Fl Ind Bat II 987 (*not of Wall*)

PI NANG *Walluh* 2159/1! PERAK *Kampung Kota Wray*! Sungai Ujong *Judley* 1870! — DISTRIB Indo China

VAR *Griiffithii*, Plain Ann Roy Bot Gard Calc III 254 Outer bracts ovate lanceolate obtuse distinctly shorter than the calyx leaves softly pubescent beneath petioles 5 in long

MALACCA Mount Ophir and Chabu, *Griiffith* 4042! PERAK Gunung Ijok, *Scortechini* 5! Ulu Kwangsu, *Scortechini* 928!

SECT 2 *PLUGOMPHOSTEMMA* Plain *Corolla tube* incurved glabrous within longer than the calyx, the limb campanulate the lips large *Nutlets* usually 4 smooth or punctulate

§ *GOMPHOSTEMMA SCORTECHINII*, Plain Journ As Soc Bong IIX ii 315 (1890) A coarse perennial herb, 3 to 5 ft high *Stems* stout, erect sulcate, woody, scabrid *Leaves* opposite, herbaceous dark green, sparsely hirsute above, closely tomentose on the nerves, other wise sparsely tomentose beneath, elliptic-oblong or obovate, acute base rather long-cuneate, margin entire or serrate, 6 to 12 in long, 3 to 6.5 in wide, petiole usually short, sometimes obsolete, occasionally as much as 1 in long *Flowers* in many flowered rather dense axillary whorls bracts subulate, 2 in long, as long as the pedicels *Calyx* 7.5 in long, prominently ribbed, hirsute within, teeth lanceolate, longer than the tube *Corolla* yellow, 2.25 in long, distinctly incurved, tomentose externally, limb 3.5 in wide *Style* hirsute towards the apex, with spreading hairs, ovary densely villous *Nutlets* white,

smooth, hispid towards the apex Ann Roy Bot Gard Calc III 260

PERAK Gunong Tujok, *Scortechini*<sup>1</sup>, Larút, *Kunstler* 1959<sup>1</sup>—  
DISTRIB Indo-China

Very closely related to *G. oblongum*, Wall., of which it appears to be the representative in the Malayan Peninsula. It extends northwards to Tenasserim, and its area thus to some extent overlaps that of *G. oblongum*.

4 *GOMPHOSTEMMA OBLONGUM*, Wall. Cat 2154 (1828). A coarse perennial herb, 3 to 5 ft high. *Stems* stout, erect, woody, somewhat 4-angled densely tomentose. *Leaves* opposite, herbaceous, dark green, hispidly hairy above, densely pubescent beneath, elliptic-oblong, acute, base rather abruptly cuneate or subtruncate, margin crenate or crenate-serrate, 6 to 12 in long, 2 to 3.5 in wide, petiole .35 to 1 in long, densely tomentose. *Flowers* in rather dense few-flowered axillary whorls, bracts ovate-lanceolate .25 in long. *Calyx* .5 in long, prominently ribbed, hirsute within, teeth lanceolate, not longer than the tube. *Corolla* white, 1.75 in long, distinctly incurved, tomentose externally except on the mid-lobe of the lower lip. *Limb* .35 in wide. *Style* glabrous or, when young, sparingly hirsute. *Ovary* villous. *Nutlets* white, smooth, hispid at the apex. Benth in Wall Pl As Rai II 12, in Lab Gen & Sp 648, and in DC Prodr XII 551 (*partly*), Miq Fl Ind Bat II 986 (*partly*), Hook f Fl Br Ind IV 697. Plain Ann Roy Bot Gard Calc III 261.

ANDAMANS Port Blair, not uncommon. — DISTRIB Indo-China

This species is very closely related to *G. Scortechinii*, from which it differs mainly in its rather smaller white flowers and its less hirsute or quite glabrous style. It has not yet been collected in any of the Malayan provinces, but having regard to the fact that *G. Scortechinii* extends northwards to Tenasserim, where *G. oblongum* is common, and thus invades the area in which *G. oblongum* occurs, it is not impossible that this species may yet be met with in the northern part of the Malayan Peninsula, it seems therefore advisable to give it a place in these *Materials*.

5 *GOMPHOSTEMMA CURTISII*, Plain Journ As Soc Beng LIX ii 315 (1890). A coarse perennial herb, 3 to 4 ft high. *Stems* rather weak, flexuous, ascending, scabrid. *Leaves* opposite, the pairs rather remote, herbaceous, dark green, hirsute above, adpressed tomentose beneath, oblong-ovate, acute, base very shortly cuneate, margin denticulate, 3 to 5 in long, 2 to 2.75 in wide, petiole 1.25 to 4.5 in long, adpressed-tomentose. *Flowers* in many-flowered lax axillary cymes, bracts narrow ovate, long-acuminate, entire, reddish, 4 to 6 in long. *Calyx* .5 in long, smooth, glabrous within, reddish, teeth lanceolate-subulate from a short wide base, longer than the tube. *Corolla* white, 1 in long, distinctly incurved, puberulous externally, limb 3 in

wide *Style* glabrous, ovary glabrous. *Nutlets* white, glabrous, punctulate Ann Roy Bot Gard Calc III 266

PENANG *Curtis* 1310! PERAK Larut, *Scortechini* 924! Wray 1233!

### 18 CYMARIA, Benth

Shrubs *Flowers* small, in lax, many-flowered, peduncled, raceme-like cymes, all axillary, or the upper ones forming a terminal thyrsoid panicle *Calyx* erect, 10-nerved, the intermediate nerves weaker than the other 5, equally 5 toothed, the tube in fruit urceolate, the throat within naked or with a few setose hairs *Corolla* tube straight, exserted, limb 2-lipped, lower lip 3 lobed, spreading, the mid lobe larger than the lateral, upper lip arched, erect *Stamens* 4, ascending under the upper lip, didynamous, the upper pair shorter, anthers connivent, the cells divaricate *Disk* equal, entire *Style-arms* unequal, the upper very short *Nutlets* subglobose or obovoid rugosely pitted, hilum very large, lateral — *DISTRIB* Species 3, in Indo-China and Malaya

CYMARIA DICHOTOMA, Benth in Wall Cat 2080 (1828) A shrub, 2 to 3 ft high *Stems* and branches faintly 4 angled, finely pubescent *Leaves* opposite, membranous, dark-green and almost glabrous except on the pubescent nerves above, paler, glandular, and closely grey pubescent beneath, ovate or rhomboid, acute or subacute, rarely acuminate, base cuneate, decurrent on the petiole, entire margin elsewhere distinctly to faintly crenate or sometimes subentire 1.5 to 4 in long, 1 to 2.25 in wide, petiole .25 to .75, rarely 1 in long, finely pubescent *Flowers* in once, or sometimes twice dichotomously branching cymes, with terminal flowers and 6 to 12 secundly arranged flowers on each branch the main peduncles .5 to 1 in long, finely pubescent, the flower-bearing branches .6 to 1.5 in long, bracts under branches spatulate-acute to lanceolate, 1 to 2 in long, bracteoles subulate, .05 in long, finely pubescent *Calyx* in flower campanulate, .08 in long, in fruit urceolate, .15 in long, glandular and pubescent especially on the nerves externally, within sparingly beset with white setose hairs above the constriction, teeth 5, equal, triangular, as long as the portion of tube above the constriction, pedicels slender, finely pubescent, .05 in long *Corolla* yellow, .16 in long, uniformly finely pubescent externally, tube distinctly exserted, lower lip spreading, 3-lobed, mid-lobe wide oblong, upper lip erect, oblong, the apex notched *Filaments* ascending under upper lip, included *Nutlets* obovoid, .03 in long, wide-reticulate on back, the upper third glandular, the apex beset with very short white hairs Benth in Wall Pl As Rar I 64, in Lab Gen & Sp 705, and in DC Prodr XII 603, Miq Fl Ind Bat II 992, Hook f Fl Br Ind IV 705, Plain Journ As Soc Beng LXVI ii 522

PERAK on limestone hills, *Scortechini* ! Ipoh Quarries, *Ridley* 9734 ! Marble Hill, Ipoh, *For* (*Ridley* 10686) !—DISTRIB Burma

The Perak specimens have rather more numerous flowered cymes than those from Burma, but are in other respects indistinguishable.

## Family XCII PLANTAGINACEÆ

[By D PRAIN]

Annual or perennial scapigerous herbs. *Leaves* usually radical, scapes axillary. *Flowers* small greenish, bracteate, often dimorphic, spicate. *Sepals* 4, imbricate in bud, persistent. *Corolla* scarious, hypogynous, lobes 4, short, imbricate in bud. *Stamens* 4, inserted on the corolla tube or hypogynous, filaments filiform, persistent, anthers large, pendulous, versatile. *Ovary* superior, 1 to 4-celled, ovules in each cell 1 to 8. *Capsule* 1- to 4-celled, membranous dehiscence circumscissile. *Seeds* 1 or more, usually attached by the centre, testa thin, mucilaginous, albumen fleshy embryo cylindric, transverse, radicle inferior.—DISTRIB Species under 100 cosmopolitan

### PLANTAGO, Linn

Annual or perennial herbs with a dense rosette of radical *leaves*. *Flowers* small, greenish, in dense spikes. *Sepals* 4, free, imbricate, persistent. *Corolla* 4-lobed, scarious, lobes short, imbricate. *Stamens* 4, adnate to corolla tube, filaments filiform, anthers 2-celled, versatile. *Ovary* superior, 2 to 4-celled ovules one or more in each cell. *Fruit* a small membranous capsule, dehiscence circumscissile. *Seeds* peltate, albuminous, mucilaginous.—DISTRIB Species under 100, mainly in temperate regions

PLANTAGO MAJOR, Linn Sp Pl 112 (1753) A perennial herb with an erect stout rhizome. *Leaves* alternate, spirally disposed, all radical, sometimes sparsely pubescent, sometimes nearly glabrous on both sides, ovate or ovate-oblong, obtuse or subacute, base long-cuneate, tapering to and decurrent on the petiole, margin often irregularly and somewhat abruptly toothed, 3 to 7, usually 5 nerved, 1 to 5 in long, very variable in width, petiole often longer than the leaf-blade, broad and sheathing at the base. *Flowers* crowded or dispersed in slender rather lax spikes 2 to 6 in long, bracts 05 to 08 in long, broadly ovate-oblong, obtuse, with scarious margins. *Calyx* 12 in long, glabrous. *sepals* oblong, obtuse or subacute bluntly keeled externally,

margins widely scarious *Corolla* 18 in long, glabrous, lobes lanceolate-acute, reflexed *Capsules* ovoid, 12 to 15 in long, glabrous, dehiscing horizontally a little above the base, the upper portion separating as a conical lid tipped by the remains of the style *Seeds* 4 to 8, angular, rugulose, dull, blackish, length 03 in Dene in DC Prodi XII 696, Miq Fl Ind But II 709, Hook f Fl Bt Ind IV 705 *P. asiatica*, Linn Sp Pl 163 Wall Cat 6412, Wall in Roxb Fl Ind ed Carey & Wall I 423 .

SINGAPORE *Hullett, Kurz* PENANG *Walker* MALACCA *Griffith*

DISTRIB Almost cosmopolitan In our area doubtless an introduced plant

## ERRATA

P 642, line 20, for "4 CARDANTHERA, Voigt," read "4 CARDANTHERA, Ham MS Line 7 from bottom, for "CARDANTHERA TRIFLORA, Voigt, read "CARDANTHERA TRIFLORA, Ham MS in Voigt

# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV, PART II—Extra Number, 1908

*Materials for a Flora of the Malayan Peninsula*—By SIR GEORGE KING, K C I E, L L D F R S, late Superintendent of the Royal Botanic Garden Calcutta and J SYKES GAMBLE, C I E, F R S, late of the Indian Forest Department

No 21

THIS Part contains two Families, No 86 *Gesneraceæ* and No 90 *Verbenaceæ*, and completes the account of the Gamopetalæ. The account of the *Gesneraceæ* was prepared by Mr H N Ridley, F R S, Director of the Botanic Garden at Singapore, and was published in the 'Journal of the Straits Branch of the Royal Asiatic Society for 1905'. The material used by him was that of the Herbaria of Singapore and Penang, together with that belonging to the Royal Botanic Garden of Calcutta, and chiefly got together by collectors employed by Sir George King, lent to Mr Ridley for the purpose. The account in the 'Straits Journal' not being quite in the form used in the 'Materials', published under the auspices of the Asiatic Society of Bengal, has been edited by Mr Gamble, with the kind help of Lt-Col Prain, of Kew, but he has been careful to make no more formal alterations than could be helped so that the work is one for which Mr Ridley alone is responsible. Only numbers personally verified or quoted by Mr Ridley have been entered under the different species. Mr Ridley, who has sanctioned what has been done, has himself furnished a few notes and additions, among them being descriptions of 3 new species, one of them the representative of a new genus. The number of species of *Gesneraceæ* herein described is 131, belonging to 20 genera, 1 genus and 2 species being new, besides 1 Sumatran species newly described.

The *Verbenaceæ* have been done by Mr Gamble. It comprises 15 genera and 72 species, of which 16 species are new to science. Two Malay Islands species are also described.

In accordance with the Rules adopted at the Vienna Conference, Latin diagnoses are appended to the new genus and the 3 new species of *Gesneraceæ*, those for *Verbenaceæ* have been published in the Kew Bulletin.

### Family LXXXVI—GESNERACEÆ

Herbs or shrubs, usually pubescent. *Leaves* opposite or apparently alternate, one of each pair being much reduced, simple entire or lobed. *Inflorescence* axillary, cymose or racemose or paniced, bracts small or large. *Calyx* of 5 sepals, often connate. *Corolla* tubular or campanulate, more or less distinctly bilabiate 5 lobed, lobes oblong or rounded. *Stamens* 4 or 2 rudimentary or absent, didynamous when four, filaments linear or filiform, or short and thick, anthers linear or oblong, or scutiform connivent in pairs, 2 celled cells splitting on the inner face. *Disk* cylindric or annular or absent. *Ovary* cylindric or oblong, style slender, simple stigma capitate, cordate or bilobed. *Fruit* a capsule linear, cylindric, fusiform or oblong, splitting dorsally. *Seeds* very numerous, minute, plumed in epiphytic species, elliptic and not plumed in terrestrial species or a fleshy berry (*Cyrtandra*).—DISTRIBUTION. Species about 600, all tropical with a few in subtropical climates.

Seeds with one or more hairs from near hilum and a single hair from apex, fruit dehiscent, a cylindric capsule —

Stamens 4 perfect

1 *ÆCHYNANIHUS*

Stamens 2 perfect ..

2 *AGALMYLA*

Seeds without hairs —

Fruit dehiscent a capsule, follicle or pyxidium —

Capsules or follicles cylindric or rarely (*Loxocarpus*) conic

Corolla funnel shaped —

Stamens 4

..

3 *DIDYMANDRA*

Stamens 2 —

Capsule linear

Stigma entire, ovate or capitate

Stigma 2 fid .. ..

4 *DIDYMOCARPUS*

5 *CHITRIA*

Capsule lanceolate or ovate

..

6 *TETRAPHYTIUM*

Corolla shortly campanulate —

Stamens 2 —

Fruit a conic follicle

..

7 *LOXOCARPUS*

Fruit a cylindric capsule —

Capsule straight

8 *PARABOEA*

Capsule twisted —

Calyx 5 lobed

9 *BOEA*

Calyx 3 lobed	..	..	10	PHYLLOBOEA
Stamens 4	..	.	..	11 BOFICA
Capsules or pyxidia ovoid or ellipsoid —				
Stamens 2 —				
Sepals free to the base —				
Stem very short, calyx lobes linear	.		12	ORCHADOCARIA
Stem elongate calyx lobes ovate			13	LEPADANTHUS
Sepals connate half way up in a campanulate calyx			14	RHYNCHOGLOSSUM
Stamens 4 —				
Fruit with dehiscence circumscissile	..		15	EPITHEMA
Fruit splitting irregularly —				
Herbs —				
Leaf solitary, flowers minute	..		16	MONOPHYLLAFA
Leaves several alternate, flowers large	..		17	STAUROGHEPHA
Shrubs leafy —				
Sepals free to the base, flowers small			18	RHYNCHOTICHUM
Sepals connate in a tubular shortly lobed calyx, flowers large			19	CYRTANDROMOFA
Fruit indehiscent, baccate, stamens 2			20	CYRTANDRA

# 1 *ÆSCHYNANTHUS*, Jack

Epiphytes or rock plants, with slender creeping or erect half-woody stems. *Leaves* opposite or whorled, fleshy or coriaceous, entire, ovate or lanceolate. *Flowers* large, usually showy, red yellow or green, in axillary or terminal heads, pedicelled. *Bracts* ovate or lanceolate, small. *Calyx* tubular or campanulate, subentire or more or less lobed, or sepals free to the base. *Corolla* tubular, curved, dilated above, shortly 2-lipped, upper lip of 2 lobes erect, lower of 2 lobes deflexed. *Stamens* 4 perfect, didynamous, usually exsert, anthers connivent in pairs, loculi oblong, parallel. *Ovary* superior, with a short cup-shaped disk at the base, style as long as stamens or shorter, stigma dilate or peltate. *Capsule* long-cylindric, base usually empty and narrower (gynophore), 2-valved loculicidally. *Seeds* innumerable, minute, oblong, rugose, with one or more hyaline scabrid hairs from near the hilum, and one from the apex.—**DISTRIB** Species about 64, in India, Malaya and Hongkong, chiefly Malayan

Seeds with a plume of hairs at one end, a single hair at the other (§ *POLYTRICHUM*), sepals free or very nearly so —

Leaves pink beneath	..	.	1	<i>Æ. Motleyi</i>
Leaves green, with transverse purple bars beneath	..		2	<i>Æ. marmorata</i>

Seeds with a single hair at each end (§ *HAPLORRICHUM*) —

Sepals free or very nearly so —				
Leaves in whorls of 4 or 5	..	..	3	<i>Æ. spectiosa</i>
Leaves crowded towards the ends of the stems, opposite, sepals glabrous			4	<i>Æ. stenophylla</i>
Leaves opposite in pairs —				



Corolla tube 2-3 in long —		
Sepals pubescent ..	5	<i>A. longiflora</i>
Sepals glabrous ..	6	<i>A. perakensis</i>
Corolla tube under 1 in long .	7	<i>A. Huldebrandii</i>
Sepals distinctly connate below —		
Calyx tubular, its mouth distinctly 5 lobed —		
Stems erect or pendent, not rooting at the nodes —		
Calyx 1 in long, lobes under 5 in long	8	<i>A. rhododendron</i>
Calyx 1 25 in long, lobes 5 in long	9	<i>A. longicalyx</i>
Stems creeping, rooting at the nodes —		
Leaves glabrous	10	<i>A. Lobbiana</i>
Leaves pubescent	11	<i>A. radicans</i>
Calyx cupular or campanulate, mouth entire or sub entire		
Calyx green, cupular .	12	<i>A. Wallichii</i>
Calyx red widely obconic .	13	<i>A. obconica</i>

1 *ÆSCHYNANTHUS MOILFYI*, Clarke in DC Monog Phan V 1 20 (1883) Epiphytic woody plant, branches erect or pendulous, about 12 to 18 in long *Leaves* opposite, fleshy, lanceolate or ovate lanceolate, acute margins undulate or not, upper surface light green, lower pink 3 to 4 in long, 5 to 1 5 in broad, petiole 25 in long *Flowers* solitary or few, axillary, pendulous, pedicels 25 in long or less *Calyx* tube short, 1 25 in long, lobe 75 to 1 in long, glabrous, blackish red *Corolla* tube 75 to 1 25 in long, dilated upwards and at the base, light green, lobes rounded, sparingly hairy, the tips of the petals dark purple brown *Stamens* brown, filaments glabrous *Ovary* oblong, with 5 glandular patches at base, style very short, cylindric stigma capitate *Capsule* cylindric, narrowed at the tip, 9 to 13 in long *Seed* 06 in long, oblong, blunt, pustular, plume 5 in long Ridley in Journ Linn Soc XXXII 500 and in Journ Str Br R As Soc No 43 12

PERAK Larut Hills Kurau and Batang Padang Wray 245, 1475 *Scortchini* Gopong, Kinta, *King's Collector* 4463 PAHANG Pulau Manis, Pihang River, *Ridley* 2151 JOHORL Batu Puhut, *Ridley* SINGAPORE Chanchu Kang *Ridley* 6244 —DISTRIB Sumatra, Borneo, Celebes, Ceram

2 *ÆSCHYNANTHUS MARMORATA*, T Moore in Paxt Fl Gard III 56 (1852 53) An epiphyte, with erect woody stems about 12 in high *Leaves* fleshy, lanceolate, acute, narrowed at the base, light green on the upper surface with lighter variegations, dull green with transverso purple bars on the lower, petiole 25 in long *Flowers* solitary or few together, axillary, pedicels slender, 25 in long *Calyx* tube very short (hardly any), lobes linear, pubescent, 35 to 4 in long *Corolla*

tube a little over 1 in long, dilated upwards, curved, lobes rounded, pubescent, green with brown bars in the mouth *Stamens* 1.5 in long, filaments hairy *Style* hairy stigma bilobed *Capsule* 6 in long, rather thick *Seed* oblong, pustular, plume 5 in long N. D. Brown in Gard Chron XVIII 787 (1882) Clarke in DC Monog Phan V 1 38 Ridley in Journ Linn Soc XXXII 500, and in Journ Str Br R As Soc No 43, 13 *Æ. zibina*, Van Houtte Cat (1851)

KEDAH at Gunong Raya, Langkawi Islands, *Curtis* 2142 PENANG Government Hill, *Curtis* 1700 Ridley —DISTRIB Burma (Meigui), Siam

3 *ÆSCHYNANTHUS SPICIOSA*, Hook Bot Mag t 4320 (1847) A shrubby plant, with erect rather stout stems about 1 ft high *Leaves* fleshy, in whorls of 4 to 5, lanceolate, acute, margins smooth or undulate, 3 to 6 in long, .75 to 1.75 in broad, petiole .125 to .25 in long *Flowers* large, showy, subterminal, clustered 10 or more together bracts linear lanceolate, hairy, .25 in long, pedicels slender, .5 in long *Calyx* lobes linear, free to the base, pubescent, .5 in long *Corolla* tube 3 in long, narrow cylindric at base, enlarged and curved above, lobes rounded, all pubescent *Stamens* .5 in long, longer than the corolla tube filaments slender, slightly pubescent *Style* stout, pubescent PAVI Mag XIV 199 Fl des Serres Ser I t 267 Miq Fl Ind Bat II 718 Clarke in DC Monog Phan V 1 33, Ridley in Journ Linn Soc XXXII 499, and in Journ Str Br R As Soc No 43, 14

PERAK Bruseh, near Bidol, *W. (r Napier)* SELANGOR Bukit Hitam, *Kelsall*, Tomoh, *Machado* —DISTRIB Java, Sumatra (*Forbes* 2526), Borneo

4 *ÆSCHYNANTHUS STENOPHYLLA* Ridley, n sp *Stem* slender, 1 to 2 ft long, internodes .5 in long *Leaves* fleshy, glabrous, crowded towards the top of the stems, linear lanceolate, subacute, slightly narrowed at base, 2 in long, .25 in broad *Flowers* solitary in the axils of the leaves, pedicels very short, angular, glabrous, .25 in long *Calyx*-lobes linear, acute, glabrous .125 in long *Corolla* (only one bud seen) small, pubescent *Capsule* papery, linear, cylindric, 1 ft long *Disk* annular *Seeds* with a single long white hair .75 in long

PERAK at Gopang Kinta, at 500 to 800 ft elevation, found growing on the hollow branch of a large tree, *Kiny's Collector* 4738 —DISTRIB Sumatra? (*Forbes* 2535)

[*ÆSCHYNANTHUS STENOPHYLLA*, Ridley, n sp *Caulis* gracilis, 30 ad 60 cm longus, 1 ad 1.5 cm intra nodos *Folia* carnosae, glabra, versus apicem caulis congesta, lineariter lanceolata, subacuta, ad basin attenuata, .5 cm longa, 6 mm lata *Flores* in axillis foliorum solitarii, pedicelli brevissimi angulares, glabri, 6 mm longi *Calyces* lobi lineares, acuti, glabri, 3 mm longi *Corolla* parva pubescens *Capsula* chartacea,

linearis, cylindrica, 30 cm longa, discus annularis *Semina* pilo unico albo 2 cm longo munita

PENINSULA MALAYANA in Prov Perak, circa 1500 ad 2500 m alt.]

5 *ÆSCHYNANTHUS LONGIFLORA*, DC Prodr IX 262 (1845) An erect woody plant, with stem over 1 ft high *Leaves* opposite, in distant pairs, fleshy, ovate, acuminate, shortly narrowed at base, 5 in long by 2 in wide, petiole 5 in long *Flowers* several, terminal, in a cluster pedicels hairy, 5 in long *Calyx*-lobes narrowly linear, 5 in long, puberulous, free nearly to the base *Corolla* tube scarlet, 3 in long, cylindric at base, dilated above, hairy, lobes short, rounded *Stamens* 75 in longer than corolla-tube, filaments slender, pubescent *Style* rather stout *Capsule* cylindric, narrow, over 6 in long Hassk Cat Hort Bogor ed 2, 154, Hook Bot Mag t 4328, De Vries Pl Ind Bat Reinw 9, Fl des Serres Ser 1, t 288, Paxt Mag XV 25, Miq Fl Ind Bat II 717, Clarke in DC Monog Phan V 1 32, Ridley in Journ Linn Soc XXXII 499, and in Journ Str Br R As Soc No 43, 14 *Lysionotus longiflora*, Bl Bijdr 766

PAHANG on trees along the Tahan River, Ridley 2167 — DISTRIBUTION Java

6 *ÆSCHYNANTHUS PERAKENSIS*, Ridley in Journ Linn Soc XXXII 449 (1895) A shrubby epiphyte, with stems about 2 ft long *Leaves* coriaceous, lanceolate, acuminate, 3 to 7 in long, 1 to 2 in wide, nerves inconspicuous *Flowers* in a terminal fascicle, on pedicels nearly 5 in long, bracts subulate, 125 in long *Calyx* lobes linear, 25 in long, glabrous, free to the base *Corolla* tube deep red, 2 to 2.5 in long, narrow at the base, dilated and curved upwards, nearly glabrous lobes rounded *Stamens* 75 in longer than corolla tube, filaments glabrous or sparingly pubescent *Capsule* more than 1 ft long *Seed* narrowly oblong, pustular, with a single hair at each end Ridley in Journ Str Br R As Soc No 43, 15

PERAK in Larut Hills at 5500 ft, Ridley, Curtis 11447 *King's Collector* 2337, 7022, at Sungai Ryah, *King's Collector* 3641, at Taiping, *King's Collector* 8314

7 *ÆSCHYNANTHUS HILDEBRANDII*, Hemsl in Bot Mag t 7365 (1894) A shrubby epiphyte, branches about 6 in long, often rooting *Leaves* fleshy, in distant pairs, glabrous, sessile, ovate, acute, base rounded, margins ciliate and with distant glands 5 in long and broad *Flowers* few, terminal at the ends of the branches, pedicels 25 in long *Calyx*-lobes free to the base, linear, acuminate, pubescent, 15 to 2 in long *Corolla* tube thick, curved, little dilated, 75 in long, glabrous, orange in colour, lobes short, red, rounded, pubescent *Stamens* shortly exsert,

hairy Capsule 6 in long, base narrowed, sterile Ridley in Journ Linn Soc XXXII 502, and Journ Str Br R As Soc No 43, 15

PERAK Larut Hills, at 4500 ft, Ridley, at Gunong Ijuk, *Scortechini* 1187 PAHANG Kluang Terbang and Gunong Benom, *Barnes* —  
DISTRIB Burma

8 *ÆSCHYNANTHUS RHODODENDRON*, Ridley in Journ Linn Soc XXXII 500 (1895) An erect epiphytic shrub, 1 to 2 ft high, stems stout, woody Leaves opposite, in distant pairs, fleshy coriaceous, ovate, acuminate, 2 in long, 1.5 in wide, nerves inconspicuous, keel prominent Flowers several together, axillary and terminal, pedicels about 5 in long Calyx tubular, deep purple, 1 in long, lobes short, acute, glabrous Corolla 3 in long, tube thick, dilated above, glabrous, lobes oblong, rounded, 5 in long, pubescent, deep red with 3 black streaks on the lower lobes Stamens very shortly exsert, little longer than the corolla, pubescent Capsule cylindric, rather stout, 4 in long, base narrowed into a gynophore Seeds with a single hair at each end, brown, scabrid Ridley in Journ Str Br R As Soc No 43, 15

PERAK Larut Hills at 2500 to 6000 ft elevation, Ridley Curtis 1311, *Scortechini* 58, 388 Plus River, *Scortechini* 468 King's Collector 2332

9 *ÆSCHYNANTHUS LONGICALYX* Ridley in Journ Str Br R As Soc No 43, 16 (1905) Stems woody over 1 ft long Leaves thick, fleshy glabrous, ovate, acuminate 2 to 3 in long, 1 to 1.5 in broad, midrib prominent, nerves obscure Flowers large, terminal, pedicels 5 in long, Calyx elongate, tubular, glabrous, red, 1.25 in long, with 5 long thin lanceolate acute lobes 5 in long Corolla red with dark blotches in the mouth, 3 in long, glabrous without mouth pubescent lobes rounded Stamens nearly as long as corolla, pubescent Style stout, pubescent, stigma capitate

PERAK *Scortechini* 36, at Gunong Batu Putih, Wray 1636  
SELANGOR Semangko Pass, A M Burn-Murdoch

10 *ÆSCHYNANTHUS LOBBIANA*, Hook Bot Mag t 4260 (1846) A climbing epiphyte, with slender stems rooting along tree trunks Leaves in pairs, coriaceous, lanceolate or ovate lanceolate, glabrous, 1.5 to 2 in long, .25 to .75 in broad, petioles short Flowers in axillary and terminal fascicles 3 to 5 together, pedicels slender, .75 in long or less Calyx tubular, 1 in long, dark purple, thickly pubescent lobes very short Corolla tube 2 in long, thick, curved, lobes deep red, thickly pubescent, broad, rounded Stamens barely exserted Capsule 1.3 in long, cylindric on a gynophore Seed very small, oblong, pustular, with a hyaline mass at the hilum, and a single long white hair at each end Fl des Serres Ser 1, t 246 Miq Fl Ind Bat II 721 Clarke in

Hook f Fl Br Ind IV 343, and in DC Monog Phan V 1 44, Ridley in Journ Str Br R As Soc No 43, 16

KEDAH at Gunong Jerai, *Ridley* 5513, at Gunong Raya, Langkawi, *Curtis* 2503 PENANG on Government Hill, *Curtis* PERAK in Larut Hills to 5000 ft alt, *Curtis*, *Wray* 873, *Scortechini* 36, 39, 330, 352 PAHANG at Pekan, *Ridley*, at Kuantan, *Dunford* SELANGOR on Pahang track, *Ridley* MALACCA *Mungay* (K D) 1218, 1219, Mount Ophi and Ayer Panas, *Ridley* 1572 JOHORE at Batu Pahat, *Ridley*, at Gunong Pulai, *G King*, at Jambu Larang, *Fielding* SINGAPORE at Sungai Tengeh, *Ridley* 2710, at Kranji, *Ridley* 2706 —DISTRIB Java, Sumatra, Borneo

*King's Collector* No 2636 from Larut, Perak is a specimen with very fleshy leaves, but cannot yet be separated from *I. lobbiana*, as there are in the series intermediates between it and the thin leaved forms. It seems to occur only at high elevations

11 *ÆSCHYNANTHUS RADICANS*, Jack in Trans Linn Soc XIV 43 (1823) An epiphytic plant growing on trees or rocks, the hairy stems creeping and rooting at the nodes, several feet long. Leaves hairy, shortly petioled, ovate, obtuse, broad at base 5 to 1.25 in long, 5 to .75 in wide. Flowers axillary, 1 to 2 together, pedicels 5 in long (calyx tubular, hairy, deep red, lobes obtuse or subacute, 75 in long. Corolla red, thick, curved, hairy, lobes subacute, glabrescent within. Stamens hardly exsert, filaments glabrous. Capsule cylindric, pubescent, acuminate, slender, 10 in long. Calc Journ Nat Hist IV 62 Spreng Syst II 838, R Br in Benn Pl Jav Rar 115, and in Ann Sc Nat 2, Vol XIII 160 DC Prodr IX 202, De Vriese Pl Ind Bat Romw 10 Miq Fl Ind Bat II 720, Clarke in Hook f Fl Br Ind IV 343, and in DC Monog Phan V 1 41, Ridley in Journ Linn Soc XXXII 501, and in Journ Str Br R As Soc No 43, 17 *Trichosporum radicans*, Nees in Flora (1825), 144, Blume Bijdr 764

PERAK Bujong Malacca, *Ridley*, Sungai Rayah, *Scortechini* 37 TRINGGANU Bundi, *Rostado* MALACCA *Griffith* (K D), *Cuming* 2387, Sungai Rambai, *Derry* 205, Sungai Ujong, *Cantley* —DISTRIB Sumatra, Java, Borneo

VAR *lanuginosa*, Ridley Calyx green, densely white woolly, as is the outside of the corolla-tube

PERAK *Scortechini* 330

12 *ÆSCHYNANTHUS WALLICHII*, R Br in Benn Pl Jav Rar 116 (1840) Stems rather slender, woody, glabrous. Leaves glabrous, lanceolate or elliptic, acuminate, narrowed at the base into the petiole, 3 in long, 1 to 1.25 in wide, petiole .25 in long. Flowers few together,

subterminal, pedicel 2½ in long, slender. *Calyx* small, cup-shaped, green, 25 in long, hairy, almost entire. *Corolla* dark red, 75 in long, tube stout, lobes rather large, rounded, hairy. *Stamens* included, filaments glabrous. *Capsule* 8 in long, narrow, terete. Ann Sc Nat 2 XIII 160, Clarke in Hook f Fl Br Ind IV 343, and in DC Monog Phan V 1 48, Ridley in Journ Linn Soc XXXII 502, and in Journ Str Br R As Soc No 43, 18. *A. radicans*, Wall Cat 798A (non Jack).

PERAK Bujong Malacca, Curtis Tapa, Wray 1417. MALACCA Mount Ophi, Lobb, Mungray (K D) 1219. JOHOREL Tanjong Kopang, Ridley, Ulu Batu Pahat, Kelsall. SINGAPORE Wallich 798A. Bukit Mandi, Chanchu Kang, Kianji, Ridley. — DISRIB Sumatra, Borneo.

13. *ÆSCHYNANTHUS OBCONICA*, Clarke in DC Monog Phan V 1 50 (1883). *Stems* about a foot long or more, woody, glabrous. *Leaves* in pairs, coriaceous, glabrous, elliptic-oblong or ovate, acuminate, narrowed at base into the petiole, 1.5 to 3 in long, .75 to 1.25 in broad, petiole .25 in long. *Flowers* subterminal a few in a cluster; pedicels .25 in long, hairy. *Calyx* deep red, obconic wide, hairy, .25 in long, mouth entire. *Corolla* 5 in long, tube thick and short, lobes rounded, hairy, deep red with yellowish white central bars. *Stamens* very shortly exsert, filaments nearly glabrous. *Capsule* 8 in long, cylindric. Clarke in Hook f Fl Br Ind IV 343 Bot Mag t 7336, Ridley in Journ Linn Soc XXXII 501, and in Journ Str Br R As Soc No 43, 18.

PERAK Batu Kuran and Bujong Malacca Curtis 390, 3335. LARUT Hills Ridley 2905. Blanja and Relan Tujur Wray 149 1772. SCORTECHINI 28, 1861, Larut Peak at 2000 to 3000 ft, King's Collector 2012, 2819 10179. DINDINGS Pangkore, Curtis 1338. SRI ANGOR Klung Beccari — DISRIB Borneo (Molloy 687 fide Hook f).

The following Sumatran species is herein described.

*ÆSCHYNANTHUS FORBESII*, Ridley, nov sp. An epiphytic shrub, stems creeping, branches slender about a foot long. *Leaves* opposite, fleshy, ovate-lanceolate, acute, 2 to 2.5 in long, .5 in broad, midrib elevated, other nerves inconspicuous, petiole 2 in long. *Flowers* subsolitary axillary, pedicels 2 in long. *Calyx* lobes free to the base, extremely short, linear or acuminate, tips setiform .2 in long. *Corolla* tube nearly .75 in long, slightly curved and dilated upwards, pubescent scarlet. *Style* hairy.

SUMATRA Mount Dempo, 5700 ft Forbes 2268. Rather remarkable for its very small calyx lobes.

[*ÆSCHYNANTHUS FORBESII*, Ridley, nov sp. Frutex epiphyticus, caules reptantes, ramis 30 cm longis gracilibus. *Folia* opposita, carnosae, ovato-lanceolatae, acutae, 5-6 cm longae, 10-15 mm latae, praeter costam elevatam nervis inconspicuis, petioli 5 mm longi. *Flores* subsolitarii axillares, pedicelli 5 mm longi. *Calyces* lobis basin liberi, brevissimi lineares vel acuminati, 5 mm longi, apicibus setiformibus. *Corollae* tubus

ad 2 cm longus, paullo curvatus et sursum dilatatus, pubescens, coccineus *Stylus pubescens*

SUMATRA ad Montem Dempo 1700-1800 m. alt calycis lobis minimis distincta ]

## 2 AGALMYLA, Blume

Climbing epiphytic shrubs, with loose bark *Leaves* alternate, long petioled, herbaceous, lanceolate or ovate-lanceolate *Flowers* showy, scarlet, in compact axillary cymes *Calyx* deeply 5-cleft, lobes narrow, acute *Corolla* tubular, ventricose above, 2-lipped, lobes 5, ovate, obtuse *Stamens* 2 perfect, long exsert, filaments slender, anthers connivent, imperfect, staminodes 2 to 3 *Disk* annular, thick *Ovary* superior, linear, glabrous, style as long as or longer than the stamens, stigma 2-lipped *Capsule* linear, long, 2-valved loculicidally *Seeds* small, oblong, with a single hair at each end — *DISTRIB* Species 3, in the Malay Peninsula and Archipelago

1 AGALMYLA STAMINATA, Blume Bijdr 767 (1826) *Stems* very long, twining, hairy, at length glabrous *Leaves* light green, elliptic-oblong, acuminate at both ends, lower surface strigose, 8 to 12 in long, 3 to 4 in broad, main nerves 8 to 10 pair, petiole 6 to 8 in long, hairy *Cymes* subsessile, bracts lanceolate, pedicels strigose *Calyx* 5 in long, lobes lanceolate, acute, pubescent, free nearly to base *Corolla* 1 in long, curved, dilated, scarlet, pubescent, lobes short, rounded. *Stamens* exsert for 1 in, glabrous, anthers oblong *Style* stout, often very short, glabrous *Capsule* 14 in long, slender R Br in Benn Pl Jav Rai 116, and in Ann Sc Nat 2, XIII 161, DC Prodr IX 263, Hook Ic Pl t 733, De Vries Pl Ind Bat Reinw 10, Hook Bot Mag t 5747, Fl des Seiers Ser 1, t 358, Miq Fl Ind Bat II 722 Clarke in DC Monog Phan V 1 56, Ridley in Journ Linn Soc XXXII 502, and in Journ Str Br R As Soc No 43, 19 *Justicia parasitica*, Lam Ill I 42 (non Vahl) *Cyrtandra staminea*, Vahl Enum I 105

PERAK Larut Hills, Curtis 2042, and Rulley 2916, Maxwell's Hill, 3000 ft, Fox and Scortechini 295, Wray 2800, at 1000 to 3500 ft King's Collector 2053, 2349, 2396, 6970 — *DISTRIB* Java, Sumatra (Forbes 1864, 1948)

## 3 DIDISSANDRA, Clarke

Shrublets or herbs, with short or tall stems, hairy *Leaves* opposite, in remote pairs or crowded at the tip *Flowers* solitary on subterminal peduncles or several on short axillary peduncles, bracts small, usually narrow *Calyx*-lobes 5, free to the base or nearly so, lanceolate or ovate *Corolla* blue, white, pink or yellow, narrowly tubular, dilated upwards,

occasionally broadly tubular, infundibuliform, limb bilobed, usually unequally, lobes rounded Stamens 4 perfect, in two pairs, filaments long, slender, anthers ovate or elliptic adhering by their faces, cells parallel, connective sometimes prolonged into a horn Disk annular, small Ovary cylindric, sessile style as long or longer, stigma broad, ovate Capsule cylindric, linear elongate, rarely short and thick, sessile, splitting along the upper edge, not twisted —DISTRIB Species about 20, in India, in the Malay Peninsula and Sumatra

Stems tall, nodes distant, flowers several together in axillary clusters, leaves hairy above —

- |                                 |                        |
|---------------------------------|------------------------|
| Leaf margins entire             | 1 <i>D. johorensis</i> |
| Leaf margins minutely crenulate | 2 <i>D. frutescens</i> |

Stems short, leaves crowded at apex, flowers 1, rarely 2 or more, on subterminal peduncles —

- |   |  |
|---|--|
| Leaves hairy above their margins serrate or dentate — |  |
| Capsule slender, cylindric —                          |  |

Sepals lanceolate acuminate 25 in long —

- |                       |                          |
|-----------------------|--------------------------|
| Leaves simply serrate | 3 <i>D. hirta</i>        |
| Leaves doubly serrate | 4 <i>D. serratifolia</i> |

Sepals oblong ovate 125 in long

- |                        |
|------------------------|
| 5 <i>D. atrocyanea</i> |
|------------------------|

- |                                      |                         |
|--------------------------------------|-------------------------|
| Capsule short, thick, fusiform . . . | 6 <i>D. latiseptala</i> |
|--------------------------------------|-------------------------|

Leaves glabrous above —

Leaf margins entire, sinuate or obscurely crenulate

- |                |                      |
|----------------|----------------------|
| Flowers orange | 7 <i>D. flammula</i> |
|----------------|----------------------|

Flowers violet purple —

- |                                       |                   |
|---------------------------------------|-------------------|
| Corolla tube slender, infundibuliform | <i>D. exilica</i> |
|---------------------------------------|-------------------|

- |                              |                          |
|------------------------------|--------------------------|
| Corolla tube wide, cylindric | 9 <i>D. atropurpurea</i> |
|------------------------------|--------------------------|

Leaf margins serrate, or dentate or lobed

Sepals glabrous —

Leaves simply dentate, corolla white with violet markings, pubescent

- |                    |
|--------------------|
| 10 <i>D. Wrayi</i> |
|--------------------|

Leaves runcinate corolla lemon yellow, glabrous

- |                          |
|--------------------------|
| 11 <i>D. quercifolia</i> |
|--------------------------|

Sepals more or less pubescent —

Leaves coarsely serrate, sepals linear lanceolate .

- |                          |
|--------------------------|
| 12 <i>D. glabrescens</i> |
|--------------------------|

Leaves deeply lobed, sepals elliptic

- |                       |
|-----------------------|
| 13 <i>D. filicina</i> |
|-----------------------|

1 DIDISSANDRA JOHORICA, Ridley in Journ Str Br R As Soc No 43, 22 (1905) Shrubby, 2 to 3 ft high, stems pustular below, hairy above Leaves alternate below, opposite above, lanceolate, acuminate, long cuneate at base, margins entire, upper surface sprinkled with short conic hairs, lower shortly scabrid hairy, 6 in long, 1 25 in broad, main nerves 6 to 7 pairs, ascending Cymes axillary, peduncles slender, hairy, 1 in long, bracts short, linear lanceolate flowers 3 to 4 to each peduncle Calyx-lobes small, linear lanceolate, acute, hairy



*Corolla* pink *Capsule* slender, cylindric, hispid, 1.5 in long *D* sp., Ridley in Journ Linn Soc XXXII 502

JOHORE at Gunong Pantii, *Ridley* 4175

2 *DIDISSANDRA FRUTESCENS*, Clarke in DC Monog Phan V 1 67, t VII (1883) A shrub with woody stems, 3 to 4 ft high, stems appressed hairy *Leaves* opposite, in alternate pairs, distant, elliptic-lanceolate to oblanceolate, subacute at apex, cuneately narrowed at base, margins minutely crenulate, upper surface sprinkled with fine hairs, lower with appressed tawny silky hairs, especially on the nerves and reticulations, 7 to 9 in long, 3 to 4 in broad, main nerves about 12 to 20 pair, petiole 1.5 to 3 in long, hairy *Cymes* axillary, sessile, with short hairy branches 1 in long, flowers 1 to 3 to each branch *Calyx*-lobes 10d, hairy, narrow, lanceolate *Corolla* white, 1.5 in long, tube funnel shaped, pubescent, lobes rounded *Anthers* ovoid, filaments curved in the middle *Ovary* glabrous, style pilose, stigma sub bilobed *Capsule* slender, cylindric, 3 in long, glabrous, longitudinally ribbed Clarke in Hook f Fl Br Ind IV 355, Ridley in Journ Linn Soc XXXII 502 and in Journ Str Br R As Soc No 43, 21 *Didymocarpus frutescens*, Jack in Malay Misc 1, part 2, 5, in Trans Linn Soc XIV 39, and in Calc Journ Nat Hist IV 58 (1844), Wall Cat 780, R Br in Bonn Pl Jav Rat 119, and in Ann Sc Nat 2, XIII 165 DC Prodr IX 265, Miq Fl Ind Bat II 726 *Henckelia frutescens*, Spreng Syst curae post 13

PENANG *Wallich* 780 *Curtis* 828, *Deschamps* PERAK at Tapa, *Wray* 826 at Waterfall Hill, *Wray* 1723 *Ridley* 2912, *Scottichum* near Kinta River, *Kny's Collector* 837 DINDINGS at Lunut, *Ridley* 7171 MALACCA *Griffith* (K D) 3856 *Murray* (K D) 1222 —DISTRIB Sumatra

3 *DIDISSANDRA HIRTA*, Ridley in Journ Str Br R As Soc No 43, 28 (1905) *Stem* woody, 3 in long *Leaves* oblanceolate, oblique, acuminate at apex, narrowed to the base, margins serrate, upper surface sprinkled with pale multicellular hairs, especially long on the marginal teeth, lower glabrous except on the midrib and nerves, which are covered with rather long multicellular hairs *Scap* 3 to 4 in long, hairy with catenulate multicellular hairs *Calyx* lobes 2.5 in long, lanceolate, acuminate, very hairy *Corolla* violet with a darker centre, tube 1 in long, broad-cylindric, sprinkled with multicellular hairs, lobes large, rounded, 5 in long, glabrous *Stamens* 2 pairs, unequal *Stigma* capitate

PERAK at Bujong Malacca, *Ridley*

4 *DIDISSANDRA SERRATIFOLIA*, Ridley in Journ Str Br R As Soc No 43, 25 (1905) *Stem* woody, 4 to 5 in high, covered in the upper part with red hairs *Leaves* opposite, oblanceolate, acuminate at apex,

long-cuneate at base, margins doubly serrate, upper surface sprinkled with pale multicellular hairs, lower glabrous except for the red multicellular hairs on the nerves and midrib, 6 to 10 in long, 1.75 to 2.25 in broad, main nerves 16 to 20 pairs, petiole 1 in long or less, hairy. *Flowers* solitary on a slender hairy 4 in long peduncle. *Calyx*-lobes lanceolate, acuminate, 2.5 in long, recurved, at length covered densely with red multicellular hairs. *Corolla* blue, 1.5 in long, tube narrowed at the base, dilated upwards, broad, sparingly hairy, lobes rounded, the lower ones longer than the upper. *Stamens* in 2 subequal pairs, half as long as the corolla-tube, filaments attached close to the base, sinuate. *Style* stout, stigma capitate. *Capsule* 1.5 in long, subcylindric, thick, 1.25 in broad, glabrous.

PERAK at Bujong Malacca, *Ridley* 9779

5 *DIDISSANDRA ATROCYANEA* *Ridley* in Journ Str Br R As Soc No 43, 26 (1905). *Stem* woody, about 6 in high. *Leaves* crowded at the top of the stem, oblong or lanceolate-oblong, inequilateral at the base, margins strongly serrate, black when dry, upper surface sprinkled with conical processes formed by the pushing in of the leaf from the under surface, each process bearing a short pale hair. Lower surface punctate and marked with the mouths of the intrusions, glabrous except for the nerves and reticulations, which are covered with rufous hairs, 4 to 5 in long, 1 to 2 in broad, petiole winged to the base, covered with multicellular hairs. *Flowers* solitary on 3 in long peduncles covered with red hairs. *Calyx* lobes oblong ovate, glabrous or with red hairs, 1.25 in long. *Corolla* deep purple with almost black mouth, nearly 2 in long, tube shortly narrowed at base, broadly cylindric above, pubescent. Lobes short, rounded, the lower lip the longer. *Stamens* 4, filaments slender. *Capsule* glabrous, cylindric curved, 1 to 2 in long.

PERAK at Bujong Malacca *Ridley*, *Curtis* 3298. *Scortechini* 368 1896, at Gunong Batu Putih, *Wray* 310

6 *DIDISSANDRA LATISEPALA*, *Ridley* in Journ Linn Soc XXXII 503 (1895). *Stem* short, woody. *Leaves* crowded at the top of the stem, oblong oblanceolate, unequal at base, margins crenate dentate, surfaces sparingly hispid, red, midrib and nerves beneath covered with red hairs, 7 in long, 2 in broad, petiole 1 in long. *Flowers* few on a 6 in long hispid peduncle. *Calyx* lobes ovate, 1.25 in long, glabrous. *Corolla* purple (?), 1 in long, glabrous, tube cylindric, dilated upwards, lobes short, rounded. *Stamens* 4, filaments linear, anthers subglobose. *Ovary* glabrous, stigma clubbed. *Capsule* short, 5 in long, thick, fusiform. *Ridley* in Journ Str Br R As Soc No 43, 26

LEGER *Machado*

7 *DIDISSANDRA FLAMMEA*, Ridley in Journ Linn Soc XXXII 503 (1895) *Stem* about 2 in long, hardly woody, pubescent *Leaves* oblong, obtuse, glabrous, upper surface shining, margins and nerves beneath hairy, 4 in long, 1.25 in wide, petiole short, pubescent *Flowers* few, pendulous on an erect stout, purple, pubescent peduncle 3 in long *Calyx*-lobes narrowly lanceolate, acuminate, green with purple hairs, 5 in long *Corolla* orange red with darker red lobes, tube narrow at base, abruptly dilated, cylindric, hairy outside, lobes short, rounded, the lower ones a little longer *Stamens* in 2 pairs, filaments slender, terete, hispid above, white, anthers globose *Ovary* white, pubescent, straight, stigma clavate *Disk* annular *Capsule* short, cylindric, purple, 1.5 in long Ridley in Journ Str B1 R As Soc No 43, 22

LEGEH gold mines north of Tringganu, *Machado*

8 *DIDISSANDRA VIOLACEA*, Ridley in Journ Str Br R As Soc No 43, 23 (1905) *Stem* woody, about 6 in high *Leaves* tufted at the top of the stem, thin, oblanceolate, subfalcate, narrowed at the base into the petiole, acuminate at apex, margins sinuate, upper surface glabrous, midrib and petiole covered with red multicellular hairs 4 to 7 in long, 1 to 2 in broad *Flower* peduncles numerous, erect, 2 to 3 in long, sparingly red hairy, 1-flowered, bracts linear lanceolate, narrow, 2.5 to 5 in long, closely appressed to the calyx *Calyx* lobes linear lanceolate, glabrous, 2.5 to 5 in long *Corolla* violet, 1 to 1.5 in long, tube rather narrow, gradually dilated upwards, sparingly pubescent, lobes unequal, the lower lip the longer *Stamens* in 2 pairs, the longer pair scarcely one fourth longer than the shorter *Ovary* glabrous, rather short, stigma broad *Capsule* 1.5 in long, moderately thick, splitting along the upper edge

PERAK summit of Gunong Batu Patih, at 6700 ft, *Wray* 383, *Scortechini* 389

This species comes near to *D. Wrayi*, but has smaller flowers

9 *DIDISSANDRA ATROPURPUREA*, Ridley in Journ Linn Soc XXXII 504 (1895) *Stem* woody, 2 in long *Leaves* lanceolate or obovate, narrowed at the base, the bases unequal, margin obscurely crenate, upper surface glabrous, lower hairy on the raised nerves, 4 in long, 1.5 in broad, petiole 1 to 1.5 in long. *Flowers* nearly sessile, in pairs on erect, glabrous, purple peduncles 3 to 5 in. long, bracts 2, ovate, 2.5 to 5 in. long, 1.25 in wide, purple *Calyx*-lobes nearly free to the base, lanceolate, acute, 2.5 to 3.5 in long, glabrous *Corolla* deep purple, 2 in long, 5 in broad, narrowed at the base, widely dilated

above, lobes short, rounded, the lower ones the longer *Stamens* in 2 pairs, filaments straight, anthers oblong appressed *Style* thick glabrous, stigma clavate *Capsule* thick, 2 in long, narrowed at the tip Ridley in Journ Str Br R As Soc No 43, 23

PERAK on rocks at Hermitage Hill, *Ridley*, at Gunong Inas, *Scortechini* 1327

*Wray* 3903, from Gunong Bubu, 5000 ft, "flowers mauve five white stripes in tube," may be this or a new species near it but the flowers are solitary on the peduncles

10 *DIDISSANDRA WRAYI*, Ridley in Journ Sti Br R As Soc No 43 24 (1905) *Stem* woody, bare below *Leaves* alternate, lanceolate, oblique, acuminate at apex, narrowed at the base into the petiole, dentate on the margin, glabrous on the upper, whitish on the lower surface, 4 to 6 in long, 1.5 to 2 in broad, main nerves 16 pairs, raised on both surfaces, midrib and nerves beneath covered with coarse reddish trichomes, petiole 5 in long, covered with rough multi cellular trichomes *Flowers* solitary, on 3 to 4 in long slender peduncles from the upper axils, their bases covered with red multicellular hairs bracts 2, ovate, broad, glabrous, appressed to the calyx, 25 in long *Calyx* lobes broadly lanceolate, obtuse, glabrous, 5 in long, white *Corolla* white pencilled with violet, 1.25 to 1.5 in long, tube thick, over 25 in through, lobes broad, rounded *Stamens* 4, didynamous, anthers rounded *Style* short *Capsule* slender, 1.5 to 2 in long, glabrous

PERAK summit of Gunong Batu Putih, 6700 ft, *Wray* 334, 353 *King's Collector* 8036

11 *DIDISSANDRA QUERCIFOLIA*, Ridley in Journ Linn Soc XXXIII 504 (1895) *Stem* woody, hairy, 6 in long or less *Leaves* crowded above, lanceolate runcinate, base narrowed, upper surface deep green, glabrous, lower glaucous with the midrib and nerves covered with brown hairs, 2 to 8 in long, 1 to 2 in broad, petiole 1 in long or less, hairy *Flowers* large, 1 to 2 on 6 in long sparsely hairy peduncles, bracts lanceolate, broad, hispid *Calyx* lobes broadly lanceolate, obtuse, green, glabrous *Corolla* lemon-yellow, glabrous, 2 in long tube dilated, cylindric from a narrow base, lobes short, rounded *Ovary* cylindric, stigma clavate *Capsule* 3 in long, glabrous, cylindric Ridley in Journ Str Br R As Soc No 43, 26

PERAK Bukit Rengas, *Fox* 10683, Maxwell's Hill, 3000 ft, *Scortechini* 292, 300, *Curtis* 2041, *Ridley* 2910

*King's Collector* 2171, from Larut Hills, 3000 to 3500 ft seems to be this, but is much larger, the stem whitish corky, nearly 12 in long, the peduncles up to 4-flowered

12 *DIDISSANDRA GLABRESCENS*, Ridley in Journ Str Br R As Soc No 43, 24 (1905) *Stem* woody *Leaves* elliptic-lanceolate or oblanceolate margins coarsely serrate upper surface glabrous, lower dotted, glabrous except on the red hairy midrib and nerves, 4 to 7 in long, 1 to 2.5 in broad, petiole 1 in long, hairy *Flowers* solitary on 4 to 5 in long hairy peduncles, bracts 1 to 2, lanceolate, oblong, 12.5 to 25 in long *Calyx*-lobes linear-lanceolate, obtuse, hairy, 2.5 to 5 in long *Corolla* mauve (*Wray*), deep blue (*King's Collector*), 1.5 in long, tube gradually dilated upwards, lobes rounded, pubescent *Anthers* subglobose *Stigma* capitate, broad *Capsule* 1.5 to 2.5 in long, cylindric, slender

PERAK summit of Gunong Batu Putih, 6700 ft, *Wray* 384, do, 2000 to 3000 ft, *King's Collector* 8055, Kinta at 3000 to 3500 ft, *King's Collector* 7191

13 *DIDISSANDRA FILICINA*, Ridley in Journ Str Br R As Soc No 43 27 (1905) *Stem* woody, pale, rather slender *Leaves* lanceolate deeply lobed with oblong rounded lobes about 13 on each side, glabrous above, paler beneath, with red appressed hairs on the midrib, 3 to 5 in long, 1 to 1.5 in broad petiole 5 in long with red appressed hairs *Flower* 1 on a slender, red, hairy peduncle 1.5 in long, bracts very small, ovate, about 1 in long, pedicel 2.5 in long *Calyx* lobes elliptic, rounded, dark red, sparingly hairy, 1 to 2 in long *Corolla* 1.5 in long, tube with narrow base, dilated upwards, trumpet shaped, sparingly pubescent at the base, purple, paler below outside, inside dark purple, with 6 white lines down the base, lower lip longer than the upper, lobes rounded *Stamens* 4, in 2 pairs, the connective prolonged in a triangular horizontal horn *Disk* annular *Capsule* subfollicular, 1.5 in long, glabrous

PERAK at Gunong Chabang, on rocks overhanging a creek, *Scortechini* 14

#### 4 *DIDYMOCARPUS*, Wall

Herbs or usually small shrubs, stems simple or branched, erect or prostrate *Leaves* herbaceous, opposite or the alternate ones reduced, seldom wanting, ovate or lanceolate, usually pubescent or hairy, petioled *Peduncles* axillary, bearing one or more flowers in a cyme *Calyx*-lobes 5, short, free to the base or nearly so *Corolla* infundibuliform, bilabiate, lobes equal or the lower ones longer than the upper *Stamens* 2 complete, filaments filiform, rising from about half-way down the tube, anthers reniform, connivent by the edges *stamino-*odes 2, short, hooked *Ovary* cylindric, passing into the style, stigma capitate or ovate, entire *Disk* annular or absent *Capsule* cylindric,

narrow, usually splitting along the upper edge. Seeds numerous, minute, ellipsoid, not plumed — **DISTRIB** Species about one hundred, in India and Malaya

**Sect I ELATA —**

Stem tall, branched shrubby leaves in distant pairs

unequal, bract 1, cupshaped 1 *D. corchoriifolia*

Stems long and weak, bracts 2, ovate 2 *D. sulphurea*

Stem weak —

Bracts ovate, amplexicaul, flowers yellow 3 *D. citrina*

Bracts oblong, glabrous, flowers claret colour 4 *D. purpurea*

**Sect II DIDYMANTHUS —**

Stem erect herbaceous, leaves in distant pairs —

Flowers very small, 25 in long, axillary 5 *D. parviflora*

Flowers medium sized

Flowers yellow —

Leaves lanceolate acute 6 *D. flava*

Leaves ovate acuminate 7 *D. ramosa*

Leaves unequal narrowly lanceolate 8 *D. flavescens*

Flowers white —

Leaves opposite equal hairy ovate —  
Edges pubescent 9 *D. hispida*

Edges conspicuously red hairy 10 *D. hirta*

Leaves lanceolate, thinly pubescent 11 *D. verrucosa*

Leaves subglabrous, equal long petioled 12 *D. albina*

Leaves glabrous, unequal —

Flowers solitary on short peduncles 13 *D. alternans*

Flowers in pairs on long peduncles from upper  
axils 14 *D. glabrata*

Stem erect herbaceous little branched, flowers yellow

corolla cylindric trumpet shaped —

Leaves petioled silky in distant pairs 15 *D. malayana*

Corolla 2 in long 16 *D. albomarginata*

Corolla 1 in long

Leaves crowded above hairy — 17 *D. flavobrunnea*

Stem slender, flowers small, congested

Stem woody —

Leaves glabrous congested at the top, not petioled,  
flowers yellow 18 *D. longipes*

Leaves alternate lanceolate, inequilateral, flowers  
blue 19 *D. inequalis*

Leaves crowded or distant, elliptic, petioled  
flowers white 20 *D. alba*

**Sect III REPTANTIS** Prostrate or creeping herbs Leaves  
in distant pairs, equal or unequal, hairy or pubescent —

Flowers blue or white, sometimes with yellow streaks —

Leaves hairy, rarely glabrous, flower in uppermost  
axil peduncle short 21 *D. reptans*

- Leaves velvety, elliptic —
- Flowers solitary, terminal .. .. 22 *D. ophirensis*
- Flowers numerous, on slender pedicels .. 23 *D. pulchella*
- Flowers orange yellow —
- Calyx lobes hairy . . . 24 *D. crocea*
- Calyx lobes narrow, subglabrous .. 25 *D. ascendens*
- Sect IV *HETTEREIA* Stems woody, usually short, with the leaves crowded towards the top, more or less hairy above, and little or not branched. Leaves hairy, silky or rarely glabrous, lanceolate, serrate, narrowed at the base into a winged petiole, alternate. Peduncles slender, axillary in the upper axils, 1 rarely 2 flowered. Bracts usually small, solitary linear. Corolla large, showy, white crimson or blue rarely yellow. Filaments long slender. Capsule narrow, cylindrical —
- Flowers solitary, bracts very small —
- Leaves glabrous wrinkled 26 *D. rugosa*
- Leaves tessellate, not wrinkled, obovate glabrous or with scattered hairs with swollen bases —
- Capsule over 2 in long .. 27 *D. platypus*
- Capsule shorter 1 in long 28 *D. komprobaea*
- Leaves not tessellate hairy or pubescent
- Leaves broad, covered with close short hairs —
- Flowers white, tipped with crimson 29 *D. quinquevulnera*
- Flowers deep crimson 30 *D. atrosanguinea*
- Leaves narrow lanceolate, densely hairy, distant, flowers yellow . 31 *D. hirsuta*
- Leaves silky pubescent on both surfaces, flowers white tinged with pink or blue 32 *D. bambucina*
- Leaves crowded, thickly appressed, hairy, flowers white or blue .. 33 *D. crinita*
- Leaves crowded covered with short scattered hairs above, deep green with central white bar, flowers white . 34 *D. fasciata*
- Flowers in pairs on a long peduncle, bracts very broad 35 *D. venusta*
- Sect V *SALICINÆ* Small shrubby plants with narrow leaves crowded at top. Flowers small —
- Leaves entire 36 *D. densifolia*
- Leaves serrate —
- Flowers 125 in long, pink 37 *D. salicina*
- Flowers 75 in long, white with purple outside, yellow in mouth .. 38 *D. seriatifolia*
- Leaves deeply cut, pinnate 39 *D. pectinata*
- Sect VI *ACUTIES* Stemless or nearly so, leaves crowded —
- Flowers panicled, lips very unequal 40 *D. violacea*
- Flowers 1 2 racemose —
- Flowers large, blue .. 41 *D. lacunosa*
- Flowers small —
- Leaves elliptic, peltate 42 *D. peltata*

Leaves obovate, crenulate —	
Capsule very short and broad	. 43 <i>D. puncticulata</i>
Capsule linear, narrow	.. 44 <i>D. heterophylla</i>
Leaves small, entire, silky	. 45 <i>D. pumila</i>
<i>Affinity doubtful</i>	
Stem tall, leaves alternate, distant    Panicles small,	
adnate to petioles	46 <i>D. lilacina</i>

## Sect I ELATÆ

1 *DIDYMOCARPUS CORCHORIFOLIA*, R Br in Benn Pl. Jav Rar 119 (1840) A shrub, 4 to 6 ft high, much branched, with a stout woody stem. *Leaves* opposite but unequal, ovate, subacute, inæquilateral, rounded at base, margins serrate, both surfaces, but especially the under, covered with soft, short, felted hair, 3 to 9 in long, 1.5 to 5 in broad, petiole 1 to 3 in long. *Panicles* lax, axillary, 2 to 3 in long, peduncles short, pubescent, flowers numerous, bracts cupshaped. *Calyx* cupshaped, 2.5 in long, shortly 5 toothed. *Corolla* 7.5 in long, white applegreen in the throat or often purplish white, tube straight, thick, lobes rounded, the upper lip recurved, the base appressed to the broad decurved lower lip which is much longer. *Capsule* cylindric, 1 to 2.5 in long, pubescent, splitting to near the tip. Ann Sc Nat 2, XIII 164, Wall Cat 792, DC Prodr IX 265, Miq Fl Ind Bat II 726, Clarke in DC Monog Phan V 1 85, and in Hook f Fl Br Ind IV 351, Ridley in Journ Bot XXVIII 68 (1890), and in Journ Str Br R As Soc No 43, 31.

PERANG *Wallich* 792 Government Hill, *Curtis* '239, *Mangay* (K D) 1227. SINGAPORE Pahang track and Semangko, *Ridley* 8553. PERAK Bujong Malacca, *Ridley* 9775, *Curtis* 3130, Gunong Hijau, *Scottichini* 1266, Kinta, at 1500 to 2000 ft, *King's Collector* 7220, 2000 to 3000 ft, *King's Collector* 10979, 10998.

2 *DIDYMOCARPUS SULPHUREA*, *Ridley* in Journ Str Br R As Soc No 43, 32 (1905) A shrubby creeper 6 to 10 ft long, stem pubescent, branched, with long internodes. *Leaves* opposite but very unequal, one up to 3 in long by 7.5 to 17.5 in broad, the opposite one 5 to 7.5 in long, 1.5 to 2.5 in wide, ovate or lanceolate acute, base unequal, cuneate, margins crenulate dentate, deep green above, purple beneath, nerves 6 to 7 pairs elevated on both surfaces, sprinkled all over on both surfaces with short hairs, more hairy on the back. *Peduncles* axillary, filiform, 4 to 6 in long, pubescent, branches at the top 2 or 3, each bearing as many flowers, bracts 2 to each pair of flowers, ovate, glabrous, 1.25 in long. *Calyx* lobes elliptic-ovate, obtuse, glabrous. *Corolla* infundibuliform, 5 in long, glabrous, upper lip short recurved, lower one longer. *Stamens* shortly exsert, filaments thick, pubescent.



*Style* stout, stigma excavate at the top *Capsule* 15 to 3 in long, rather thick, cylindric, acuminate, glabrous

PERAK Gunong Hijau, Gunong Chabang and Gunong Bubu, *Scortechini* 6, Gunong Batu Patih, at 3000 to 4000 ft, *King's Collector* 8059, do 4500 ft, *Wray* 219, Bujong Malacca, *Ridley* 9774

VAR *breviflora*, *Ridley* 1c Bracts and calyx-lobes narrower, acute, pubescent *Corolla* smaller, 25 to 5 in long *Capsule* pubescent, 75 in long

SELANGOR Bukit Kutu, *Ridley* 7582

3 DIDYMOCARPUS CITRINA, *Ridley* in Journ Linn Soc XXXII 508 (1895) A soft weak herb, about 1 ft high, pubescent *Leaves* soft, opposite but unequal, the larger 2 to 3 in long 1 25 in wide ovate or ovate lanceolate, velvety, margins crenulate, petiole 5 to 3 in long *Panicles* axillary, 3 in long, pubescent at base, glabrate above bracts ovate cordate, acute, nearly amplexicaul, polished green with red edges pedicels 5 to 1 in long, terete, glabrous *Calyx* lobes triangular spreading, stiff, green, edges red *Corolla* lemon yellow, pendulous tube 1 in long, funnel-shaped, base narrowed, mouth dilate, 5 in across upper lobes broad, rounded, recurved lower ones larger *Stamens* 2 filaments short, sinuate, pubescent, anthers subtriangular *Ovary* and style 5 in long, pubescent, stigma peltate *Disk* cylindric *Capsule* 1 in long, angled, glabrous Journ Str Br R As Soc No 43, 32

KEDAH, Gunong Jereh, at 2000 ft alt, *Ridley* 5518

4 DIDYMOCARPUS PURPUREA, *Ridley* in Journ Linn Soc XXXII 508 (1895) *Stem* herbaceous, 12 to 18 in high *Leaves* ovate, acute, inaequilateral, velvety 4 in long, 2 in broad, margins crenulate, petiole 25 to 5 in long *Panicle* erect, subterminal, 4 in long, with slender branches, peduncle 3 in long, glabrous bracts small, ovate *Calyx* lobes spreading, oblong, glabrous, short *Corolla* tubular, purple tube narrowed at base, lobes rounded, lower ones longer *Stamens* 2, filaments filiform, included, stamnodes filiform *Ovary* cylindric stigma broad, discoid *Capsule* 5 in long, cylindric, glabrous, stipitate Journ Str Br R As Soc No 43, 33

\* KEDAH Lankawi Island on Gunong Chinchau, 1000 to 1500 ft, *Curtis* 2567

## Sect II DIDYMANTHUS

5 DIDYMOCARPUS PARVIFLORA, *Ridley* in Journ Str Br R As Soc No 43, 33 (1905) A small erect herb about 1 ft high or less, much branched, stem slender, covered with appressed hairs *Leaves* opposite, equal, lanceolate, acute, 1 in long, 25 in broad, glabrous and punctulate on the upper surface, on the lower yellow pustular and

with short translucent hairs which are longer and multicellular along the margin, midrib and nerves, nerves 5 pairs, petiole 25 in long, hairy. *Flowers* solitary, axillary on slender hairy peduncles 25 in long. *Calyx* lobes linear, obtuse, pubescent. *Corolla* 25 in long, yellow pubescent, tube broad, straight lobes short, broad, rounded. *Stamens* nearly as long as corolla lobes, anthers large, white, reniform, filaments glabrous. *Ovary* as long as stamens, pubescent, stigma capitate, entire. *Capsule* slender, pubescent.

NEGRI SELMBILAN at Gunong Angsi, *Ridley*

6 *DIDYMOCARPUS FLAVA*, *Ridley* in Journ Linn Soc XXXII 507 (1895). *Stem* 1 ft tall, scabrid, branched. *Leaves* lanceolate acute, base narrowed, denticulate on the margins, scabrid beneath, covered on the nerves with short hairs, 3 in long, 1.5 in broad, petiole 5 in long. *Cymes* axillary and subterminal, on hairy peduncles 1 to 2 in long, pedicels 5 in long. *flowers* 4 or 5. *Calyx* short lobes hispid lanceolate. *Corolla* glabrescent, yellow, 7.5 in long, tube straight, dilated upwards, lobes short, obtuse. *Style* slender, pubescent. *Capsule* cylindric, 1.5 in long, hispid. *Ridley* in Journ Str Br R As Soc No 43, 34.

PERAK Larut Hills, *Ridley* 2914, *Curtis* 2690, at 2500 to 3000 ft, *King's Collector* 2151, *Scottcham* 563.

VAR *purpurascens*, *Ridley*. *Stems* stouter, over 1 ft high, hairy. *Leaves* opposite, equal, obliquely ovate acute, often purple as is the stem.

PERAK Bukit Kapayung, Sungai Siput, *Ridley*

7 *DIDYMOCARPUS RAMOSA*, *Ridley* in Journ Str Br R As Soc No 43, 34 (1905). *Stem* slender, branched, pubescent with appressed hairs, over 1 ft tall. *Leaves* distant, opposite, but one of each pair much smaller, ovate acuminate, thin, rounded or slightly narrowed at the base, glabrous above, sparingly hairy on the nerves beneath, nerves about 7 pairs. 2 to 3 in long, 1.5 in wide or smaller, petiole 1.25 in long. *Peduncles* slender, from the lower axils, 1.25 in long, 2 flowered, viscid hairy. *Calyx*-lobes lanceolate acuminate, viscid hairy, 1.25 in long. *Corolla* tube straight, hardly dilated, 5 in long, greenish yellow, bilabiate, lower lobe longer than upper, lobes rounded. *Stamens* 2, filaments long filiform, anthers oblong. *Ovary* long-cylindric, style long, slender, stigma capitate, small.

PERAK Gunong Batu Putih, *Wray* 868.

8 *DIDYMOCARPUS FLAVESCENS*, *Ridley* in Journ Str Br R As Soc No 43, 35 (1905). *Stems* slender, over 1 ft long, covered with short appressed hairs. *Leaves* distant, opposite but unequal, lanceolate, acuminate at both ends, entire, sprinkled over on both surfaces with

short scattered hairs, 1.5 to 2 in long, 5 in wide, petiole .15 to 2 in long, silky-hairy *Peduncles* 1-flowered, slender, subterminal, 1 in long, pubescent *Calyx*-lobes linear, hairy *Corolla* yellowish-white, 5 in long, pubescent, tube straight, cylindric, hardly dilated above, bilabiate, lobes short, rounded *Stamens* 2, filaments filiform *Ovary* short, cylindric, style short, pubescent, stigma capitate

SELANGOR Kwala Kubu, *Ridley* 7585

9 *DIDYMOCARPUS HISPIDA*, *Ridley* in Journ Linn Soc XXXII 507 (1895) *Stem* 6 to 12 in tall, hispid *Leaves* opposite, equal, ovate or lanceolate, acute or acuminate at both ends, 3 to 5 in long, 1 to 2 in wide, scabrid on the upper surface, hairy on the lower, especially on the nerves, petiole 1 in long *Peduncles* 1 to 3, erect from the upper axils, 3 in long, hairy, with 3 or 4 terminal branches, bearing a few flowers, pedicels hispid, 5 in long, bracts linear, 2.5 in long *Calyx* 2.5 in long, lobes lanceolate, hairy *Corolla* glabrous, 1 in long, white with violet streaks in the lower lip, tube straight, funnel shaped, upper lobes ovate subacute, lower ones longer *Stamens* 2 filaments slender, nearly straight, filiform, staminodes short, clubbed, 2 *Ovary* fusiform, pubescent style terete, stigma capitate *Capsule* 1.5 in long, straight, cylindric *D. hispidula*, *Ridley* in Journ Str Br R As Soc No 43, 35

PERAK Larut Hills at 4000 to 6000 ft, *Curtis* 1312, 2037, *Ridley* King's Collector, *Scortechini* 467

VARIETY *selangorensis*, *Ridley* *Leaves* shorter, glabrous above *Calyx* lobes longer *Capsule* 3 in long, softly velvety

SELANGOR Gunong Semangko, *Curtis* 3752

10 *DIDYMOCARPUS HIRTA*, *Ridley* in Journ Str Br R As Soc No 43, 36 (1905) *Stem* herbaceous, branched, about 1 ft tall, thickly covered with rather long reddish multicellular hairs *Leaves* opposite, ovate or ovate-lanceolate, subacute, narrowed at the base, 3 in long, 1 to 1.5 in wide, margin serrulate, hairy, rather densely hairy on the upper surface with multicellular hairs, on the lower surface, midrib, and nerves covered with close long pale hairs, petiole 2.5 in long, hairy *Peduncles* subterminal, 2.5 in long, very hairy, red, bract very small, linear, flowers solitary on the peduncles *Calyx* lobes linear, narrow, hairy, 1.5 to 2 in long *Corolla* absent *Capsule* 2 in long, cylindric, closely but very shortly hairy *Ovary* cylindric, style long, pubescent, stigma discoid

SELANGOR above the gap, Semangko Pass, *Curtis*

11 *DIDYMOCARPUS VISCIDA*, *Ridley* in Journ Str. Br R As Soc No 43, 36 (1905) *Stems* slender, 6 in long or more, shortly roughly hairy *Leaves* opposite, thin, lanceolate or ovate-lanceolate, acuminate, base inæqualateral upper surface sparingly scabrid hairy, lower hairy on

the nerves, 3 to 4 in long, 1 to 1.5 in broad, main nerves about 6 pairs, petiole 5 in long, roughly hairy *Peduncle* subterminal, 2 in long, viscid hairy, cyme-branches 1 in long *Calyx*-lobes very short, lanceolate, viscid hairy *Corolla* rather over 5 in long, tube swollen at base, then funnel-shaped, white, sparingly pubescent *Stamens* 2, included, filaments filiform *Style* shorter than stamens *Capsule* slender, cylindric, acuminate, viscid hairy, 1 in long

PERAK Gunong Keledang, *Ridley* 9781

12 *DIDYMOCARPUS ALBINA*, *Ridley* in Journ Str Br R As Soc No 43, 37 (1905) *Stem* 2 to 3 ft tall, herbaceous, appressed hairy *Leaves* opposite, equal, lanceolate or ovate-lanceolate, acuminate at base and apex margins shortly serrate, 4 to 6 in long by 1.5 to 2 in wide, glabrous except the midrib on the back, which is covered with appressed hairs petiole appressed hairy, 1.5 in long *Peduncle* axillary, 3 in long, with a lax few-branched terminal panicle 1 in long, bracts and bracteoles linear *Calyx*-lobes lanceolate acuminate, 1 in long *Corolla* 5 in long, waxy white, slightly pubescent, tube cylindric, limb distinctly bilobed *Stamens* 2, filaments glabrous, anthers ovate lanceolate *Ovary* and style pubescent

PERAK Gunong Batu Putih, at 3000 to 4000 ft, *King's Collector* 8070

This is allied to *D. hispida* *Ridl* but with nearly glabrous and more lanceolate leaves and smaller flowers

13 *DIDYMOCARPUS ALTERNANS*, *Ridley* in Journ Str Br R As Soc No 43, 37 (1905) *Stem* about 1 ft tall, erect, scabrid hairy above, rather slender *Leaves* thin, subalternate or opposite, lanceolate acuminate, base inæquilateral cuneate, entire or slightly serrate, 3 in long by 1.25 in wide, nearly glabrous except the midrib on the back and petiole, 2.5 in long, which are scabrid hairy opposite leaf reduced to a small ovate blade 5 in long or wanting *Flowers* solitary, axillary on short pedicels, slender, 1.25 to 2.5 in long with 2 linear small bracts, all pubescent *Calyx* lobes lanceolate acute, hairy 1.25 in long *Corolla* 5 in long, white, centre yellow, tube narrowed at the base, dilated upwards, pubescent, lobes subequal, rounded, lips not very distinct *Stamens* 2, filaments filiform, included, anthers elliptic, connate, staminodes filiform, short, clubbed *Style* fairly long, hairy, stigma capitate *Capsule* slender, cylindric, glabrous, 1 in long

PERAK at Bujong Malacca, *Ridley* 9777, *Curtis* 3133, Larut Hills, 500 to 1500 ft, *King's Collector* 2311 On banks up to 4000 ft

14 *DIDYMOCARPUS GLABRATA*, *Ridley* in Journ Str Br R As Soc No 43, 38 (1905) A slender branched herb over 1 ft high, almost

glabrous except for a little pubescence on the stem and petioles *Leaves* opposite, subequal or one leaf larger than the other, elliptic or ovate, apex subacute, base cuneate or rounded and oblique, margins entire, 1.5 to 3 in long, 1 in broad or less, main nerves 7 pair, with midrib pubescent, petiole slender, pubescent, .25 in long or less *Peduncles* from the upper axils 2 flowered, axillary, 2 in long, pubescent, bracts very small, linear, pedicels .25 in long, pubescent *Calyx* lobes narrowly lanceolate, .125 in long *Corolla* white (not seen) *Capsule* linear, acuminate, 1.5 in long, pubescent

JOHORE at Gunong Pantu, *King's Collector* 209

15 DIDYMOCARPUS MALAYANA, Hook f in Gard Chron II 123, fig 24 (1896) *Stem* very short, up to 3 in long *Leaves* ovate obtuse shortly petioled to lanceolate acute, long-petioled, 7 in long, 2.75 in broad main nerves 15 pairs, conspicuous, silky-hairy *Peduncles* stout, silky hairy, 3 to 4 in long, scapose with 2 flowers at the top or with 2 erect branches 3 in long bearing 8 or 9 flowers each flowers nodding *Calyx* lobes linear, obtuse, pubescent, long *Corolla* 2 in long bright yellow, tube narrowed at the base gibbous, inflated above, hairy lobes rounded, subequal *Stamens* 2 filaments included, curved, glabrous anthers shield shaped with 2 projecting horns on each staminal nodes minute, tooth like *Ovary* conic, hairy, style long, glandular pubescent, stigma capitate *Disk* cylindric *Capsule* cylindric, 1 to 1.5 in long Bot Mag t 7526, Ridley in Journ Sta Br R As Soc No 43, 38

PLERAK Bujong Malacca, *Curtis* 3300, *Ridley* 9778, Tanjong Malim, *Baldwin* Chabong, *Scottchum* 189 Ulu Bubong and Ulu Kulung, *King's Collector* 8799, 10197, SLIANGOR Gunong Semangko, *Curtis* 3300, Bukit Kutu, *Ridley* 7580, Ginting Bidai, *Ridley* 7581 Usually at 1500 to 3000 ft alt

16 DIDYMOCARPUS ALBOMARGINATA, Heinsley in Journ Bot XXV 204 (1887) *Stem* 6 to 12 in tall, pubescent, red *Leaves* elliptic or ovate, obtuse, with a broad or cuneate base, dark green, edges and nerves white, sparsely hairy above, silky beneath, nerves about 10 pairs, 3 to 4 in long, 1 to 1.5 in wide *Peduncles* axillary and subterminal, hairy, pink, 3 in long, racemose or sparingly branched *Calyx* lobes lanceolate, hairy *Corolla* yellow, tube narrow, pinkish white, dilated upwards, lobes subequal, rounded *Stamens* 2, filaments thickened at the base, curved, anthers reniform with short processes, staminodes 2, filiform, hooked *Ovary* cylindric, conic, pubescent, style long, stigma wide, discoid *Capsule* cylindric, acuminate, rather thick, tip upcurved, hairy, .75 in long *Ridley* in Journ Linn Soc XXXII 506, and in Journ Str Br R As Soc No 43, 39

PERAK Larut Hills, 3000 to 5000 ft, *Wray* Curtis 2039, 2991  
*Ridley* 2908, *King's Collector* 1817

A species closely allied to *D. malayana*, and difficult to distinguish from it in dried specimens except from the much smaller flowers

17 DIDYMOCARPUS FLAVOBRUNNIA, *Ridley* in *Trans Linn Soc Ser* 2, III 329 (1893) *Stem* slender, seldom branched, densely pubescent, 3 to 4 m tall *Leaves* alternate, ovate lanceolate, acute, base unequal narrowed, margins serrate, 7 in long, 3 in wide, nerves and midrib beneath covered with shining brown hairs, above sparingly pubescent *Peduncles* 8 in long, stiff, hispid, branched shortly dichotomously above, branches short, crowded, flowers numerous, small, bracts lanceolate, acuminate, 25 in long, hispid pedicels short *Calyx* lobes linear, narrow, pubescent *Corolla* 1 in long tube cylindric, gradually dilated towards the lips, lobes unequal, rounded, short tube brownish outside, limb yellow with an orange spot in the mouth and some red streaks *Stamens* 2, with filiform filaments *Ovary* elliptic *Capsule* 1 in long, narrowed gradually from the base, splitting above nearly to the apex, glabrous *Journ Str Br R As Soc* No 43, 39

PAHANG Tahan River woods, *Ridley* 2163

The fruits crowded at the top of the peduncle radiating in all directions give this species the appearance of a *Parabaa*

18 DIDYMOCARPUS LONGIPES, *Clarke* in *DC Monog Phan* V 1 86 (1883) *Stem* woody, 2 in long, hairy at the top *Leaves* oblanceolate narrowed to the base obscurely serrate, glabrous and deep green above, hairy on the midrib and purple beneath 8 in long, 2.25 in broad *Flowers* few, racemose (occasionally pinnate), pendent on peduncles 9 to 18 in long, rather stout purple *Calyx*-lobes linear, acuminate, pubescent, purple, 1.25 in long *Corolla* 1.5 in long, pale yellow, pubescent, tube straight, little dilated upwards, upper two lobes short, rounded, lower longer, oblong *Stamens* 2, filaments short, thick, adnate to the tube near the mouth, anthers reniform, connate just included, with 2 short appressed horn like processes to the connective *Ovary* elongate, conic, passing into the terete style, stigma discoid *Disk* cylindric *Capsule* 1.25 in long, rather thick, splitting along the upper edge *Clarke* in *Hook f Fl Br Ind* IV 351, *Ridley* in *Journ Linn Soc* XXXII 509, and in *Journ Str Br R As Soc* No 43, 40

MALACCA Mount Ophir, *Griffith* (K D) 3854, *Cuming* 2385, *Mann-gay* (K D) 2723, *Ridley* 3179

19 DIDYMOCARPUS INÆQUALIS, *Ridley* in *Journ Linn Soc* XXXII 506 (1883) *Stem* woody, 5 in or more tall, 1.25 in thick, brown-

pubescent *Leaves* alternate, distant, lanceolate, inæquilateral, acute, serrate, narrowed to the base, velvety above, pubescent beneath, 5 in long, 1 5 in wide or smaller, petiole distinct, pubescent, 5 in long *Peduncles* from the upper axils 1 5 in long, pubescent, flowers crowded, pedicellate bract linear, nearly 25 in long *Calyx* campanulate, lobes not free to the base, linear, 125 in long, pubescent *Corolla* blue, 1 in long tube slender, enlarged upwards lobes short, rounded, filaments long slender *Ovary* elongate cylindric, stigma obconic *Capsule* cylindric glabrous, 1 5 in long Ridley in Journ Str Br R As Soc No 43 41

KIDAH on Lankawi Island at Gunong Chinchang, Curtis 2568

20 DIDYMOCARPUS ALBA, Ridley in Journ Str Br R As Soc No 43, 41 (1905) *Stem* woody creeping, ascending, hairy pubescent *Leaves* crowded towards the top lanceolate acute at base 2 in long, 25 to 5 in wide softly densely hairy on both sides petiole densely hairy, 5 in long *Peduncles* short, 5 in or less long, 1 flowered, densely hairy *Calyx* lobes free to base, linear, acuminate, long hairy, 125 in long *Corolla* quite white 5 in long, base cylindric, gradually dilated upwards, hairy lobes short rounded, subequal *Stamens* 2, filaments rather short filiform staminodes 3, filiform, clubbed, shorter *Ovary* pubescent *Capsule* 75 in long, curved, acuminate, splitting along the upper surface, glabrous

PIRAK at Bujong Malacca, Curtis 3299, Ridley 9780 *Scortachian*

VAR *major*, Ridley *Stems* taller, over 1 ft high *Leaves* more remote and less hairy *Peduncles* longer, 1 in in flower, 1 25 in in fruit *Corolla* 1 in long

PIRAK at Gunong Bubu, 4500 ft Wray 3209

### Sect. III RITANIS

21 DIDYMOCARPUS RITANS Jack in Mal Misc I pt ii 3 (1820), and in Trans Linn Soc XIV 35 *Stems* creeping, 6 in or more long, villous *Leaves* opposite, ovate or elliptic, blunt at apex, narrowed or rounded at base upper surface sprinkled with villous hairs, lower more hairy margins obscurely crenulate, 75 to 3 in long 5 to 75 in broad *Peduncles* slender, subterminal, 1 flowered hairy, 1 in long, bract very small, pedicel 25 in long *Calyx* lobes linear, villous, 125 in long *Corolla* 5 in long, pubescent, white with purple and yellow streaks in the mouth, tube trumpet-shaped, lobes rather large, rounded *Stamens* 2, filaments far included, filiform, staminodes very short *Ovary* cylindric style slender, stigma discoid *Capsule* 1 in long, slender, scabrid, splitting nearly to the apex Calc Journ Nat Hist IV 55 Spreng

Syst II 837 Wall Cat 787, G Don Gen Syst Diehl Pl IV 659 R Br in Bonn Pl Jav Rar 119, and Am Sc Nat 2, XIII 164 DC Prodr IX 286, Miq Fl Ind Bat II 726, Clarke in DC Monog Phan V 1 95, and in Hook f Fl Br Ind IV 352 Ridley in Journ Linn Soc XXXII 511, and in Journ Str Br R As Soc No 43, 42 *Henckelia reptans*, Sprong Syst curae post 14

PENANG Walluch 787, Mungray (K D) 1223 Lobb 335 at Pulau Betong, Curtis 1706, Penang Hill, G Kuny SINGAPORE Bukit Kutu, Ridley 7585

VAR *monticola*, Ridley More slender, and creeping for 1 5 ft or more, the shoots covered with rufous hairs Leaves narrower, lanceolate, acute narrowed into the petiole, 2 to 3 in long, 3 to 5 in broad *D ? producta*, Clarke in DC Monog Phan V 1 96

PLERAK Gunung Batu Putih, Way 180, 927, Lumut Hills Curtis 2040, 2992 Ridley 2912 *Scortechini* 20, 257 Goping Kuny's Collector 1099 DINDINGS Simpiti, near Lumut, Ridley 3062 SINGAPORE Puhang track, Ridley 8561 Ginting Bidai, Ridley 7586 NIGRI SEMBILAN Bukit Tamiang and Bukit Sulu, Cantley's Collector DISTRICT Sumatra (*Horsfield*)

VAR *violascens* Ridley Stems ascending for 1 ft or so Leaves rather remote, nearly glabrous above except for dense hair on the margins and midrib more hairy beneath, nerves elevated, densely appressed hairy Flowers purplish white

SINGAPORE Rawang, Ridley 7583, Dusun Tera, Ridley 7584

22 DIDYMOCARPUS OPHIRINENSIS, Ridley in Journ Str Br R As Soc No 43, 43 (1905) Stem creeping, over 1 ft long Leaves opposite, somewhat unequal, elliptic dark green with white on the nerves, 1 to 3 in long, 5 to 1 in wide, base rounded, above sprinkled with short hairs, beneath paler, more hairy, margins entire, thickly hairy nerves 5 to 6 pairs, densely hairy, petiole 25 in long hairy Peduncles subterminal, 1 in long, hairy Calyx-lobes linear, 125 in long, densely hairy Corolla 75 in long, gradually dilated forwards, rather broad at the top, hairy purple and white, upper lip much shorter than lower one Stamens filiform, little shorter than the corolla Style slender stigma capitate Capsule cylindric, hairy, 1 in long

MALACCA lower part of Mount Ophir, Ridley 3185

Ridley says "I took this at first to be *D marginata* (Clarke in DC Monog Phan V 1 96, and in Hook f Fl Br Ind IV 352, which was based on a plant collected in Malacca or Luzon by Lobb, but which, from the description, may be a form of *D reptans*, and the locality of which is doubtful "

23 DIDYMOCARPUS PULCHELLA, Ridley in Journ Str Br R As Soc No 43, 44 (1905) Stems slender, 3 to 6 in long, purple, covered with



appressed hairs *Leaves* opposite, elliptic, obtuse, 1 to 2 in long, dark green above with a central white stripe, dotted with short hairs, beneath purple, sprinkled with hairs, the nerves and edges hairy, petiole 25 to 5 in long, hairy *Peduncles* axillary, 1 in long, slender, hairy, bract linear very small, pedicel 5 in long, slender, hairy *Calyx*-lobes narrowed, linear, 125 in long, hairy *Corolla* white, with yellow in the mouth, nearly 1 in long tube cylindric, hardly dilated, sparingly hairy, lobes oblong, rounded *Stamens* 2 fertile, filaments filiform, straight, anthers oblong *Ovary* slender, cylindric, pubescent, with style 4 in long *Capsule* narrow, cylindric, upcurved, 15 in long, pubescent

PAHANG Kwala Lipis, Machado 11629

24 *DIDYMOCARPUS CROCEA*, Ridley in Journ St B R As Soc No 43, 44 (1905) *Stems* succulent, creeping, pubescent, 1 ft or more long *Leaves* opposite but unequal ovate obtuse surface softly hairy, green with white veins 1 to 3 in long, 75 to 125 in broad nerves raised beneath petiole 5 in long or less *Peduncles* subterminal, 1 to 3 in long 1 flowered softly hairy, bracts 2, short, linear *Calyx* lobes linear pubescent 15 to 2 in long *Corolla* orange yellow, pubescent, bilabiate, 2 in long tube narrowed at the base, dilated, gibbous above lobes rounded, darker orange, lower lip longer than upper *Stamens* 2, filaments sinuate anthers with 2 processes each on the back staminodes filiform, hooked *Style* slender stigma capitate *Capsule* rather thick, curved upwards, 125 in long, pubescent

PERAK Gunong Keledang, on banks, Ridley 9776 Curtis 3301, Sungkei, King's Collector 3014

25 *DIDYMOCARPUS ASCENDENS* Ridley in Journ Linn Soc XXXII 512 (1896) *Stem* rather slender, creeping, ascending, branched above 4 to 8 in high branches 2 in long or more *Leaves* crowded above opposite, subequal ovate, subacute, narrowed or broad at base, entire surface dark green silky hairy the edges white silky, 15 to 2 in long, 5 to 1 in broad petiole 1 in long or less *Flowers* solitary on hairy peduncles 5 to 1 in long *Calyx* lobes linear, acuminate, silky *Corolla* orange yellow, 15 in long, narrow cylindric, dilated above, pubescent lobes short, rounded, subequal *Stamens* 2, filaments long, thick anthers triangular, obtuse *Ovary* cylindric, pubescent style long stigma ovate, triangular *Capsule* cylindric, acuminate, 1 in long Ridley in Journ St B R As Soc No 43, 45

PERAK Tapa, Haviland, Curtis 3106, Goping, King's Collector 458

#### Sect. IV. HETEROBELA

26 *DIDYMOCARPUS RUGOSA*, Ridley in Journ St B R As Soc No 43,

45 (1905) *Stem* short, stout, woody, 2 to 3 in long. *Leaves* crowded at the top, rather thick, oblong, oblanceolate, winged to the base, dentate, glabrous and strongly bullate, wrinkled above, beneath pubescent with midrib and nerves hairy, nerves very numerous and close (about 40 pairs), nervules transverse, strongly raised, 3 to 5 in long, 1.5 to 2 in wide. *Peduncles* slender, 3 in long, hairy, ebracteate, flowers solitary. *Calyx* lobes short, ovate acute. *Corolla* tube trumpet-shaped, 1 in long, lower lip longer than the upper, lobes broad, white with yellow central bar. *Stamens* 2, anthers narrow, connective 2 horned, staminalodes short, very slender, hooked. *Ovary* and style very hairy, stigma broad, reniform.

PERAK Hulu Selama, *Scotectum* 1273. KEDAHIAN Kuala Lebui, *In Gimlett*.

27 *DIDYMOCARPUS PLATYPUS*, Clarke in DC Monog Phan V : 91 (1883), and in Hook f Fl Br Ind IV 352 (1884). *Stem* woody below, pubescent, leafy above, 1 to 22 in long. *Leaves* sessile alternate, oblanceolate, 8 to 13 in long 3 in wide margins serrate above sprinkled with multicellular hairs from a swollen base, beneath glabrous except for the elevated nerves and reticulations, densely appressed hairy. *Peduncles* numerous, axillary, 1 in long slender, hairy bracts 2 short, lanceolate, hairy, pedicel 1 flowered, 5 in long, hairy. *Calyx* lobes ovate, obtuse, hairy 1 in long. *Corolla* from a narrow base dilated forwards, 1.25 in long, sparingly hairy, white with a yellow mouth, lobes broad, rounded. *Stamens* 2 filaments filiform, long anthers reniform, with a process of the connective projecting beyond them. *Style* long, slender stigma wide, discoid. *Capsule* cylindric, 1.5 in long, pubescent. Ridley in Journ Linn Soc XXXII 505 and in Journ Str Br R As Soc No 43, 46.

PERAK Gunong Batu Putih, *Hay* 934. Gopong, *Kings collector* 832. SELANGOR Klang, *Beccari* 5. Kuala Lumpur *Ridley* NIGRI SIMPILAN Perhentian Tinggi, *Ridley* 10097. Bukit Temiang, *Cantley*. MALACCA *Griffith* (K D) 3825. *Mangay* (K D) 1226. *Cunning* 2359. Ayer Panas, *Derry* 111, *Harvey*. JOHORE Ulu Batu Pahat, *Kelsall*. Gunong Pulai, *Ridley* 3729. SINGAPORE Bukit Timah, *Schitu*. *Ridley*—DISTRIB Sumatra.

28 *DIDYMOCARPUS KOMPOBLA*, Clarke in DC Monog Phan V : 92, t 10 (1883). *Stem* woody, 4 to 5 in tall. *Leaves* crowded at the top, oblanceolate, acute, narrowed towards the base, 5 to 9 in long, 2 to 3 in wide, margins coarsely crenate dentate, above glabrous when adult, with a few multicellular hairs when young, beneath minutely pubescent, nerves and reticulations elevated midrib and main nerves with long brownish appressed hairs. *Peduncles* 1-flowered, 4 in long.

hairy *Calyx*-lobes ovate, hairy, 125 in long *Corolla* white with yellow in the throat, tube 1 in long, base narrowed, above somewhat abruptly swollen, nearly glabrous, lower lip longer than the upper one *Stamens* 2, filaments filiform, anthers oblong *Capsule* 175 in long, moderately thick, pubescent Ridley in Journ Str Br R As Soc No 43, 44

PAHANG Tahan River Woods, Ridley 2152 SELANGOR Bukit Hitam, Kelsall

29 DIDYMOCARPUS QUINQUEVULNERA, Ridley in Trans Linn Soc Ser 2, III 328 (1893) *Stem* woody, 6 to 9 in tall or less, covered with brown wool *Leaves* lanceolate, acuminate, acute, serrate, narrowed to the base, silky pubescent, dark green, 6 in long, 2 to 2.5 in wide *Peduncles* slender, rosy, white ciliate, flowers numerous *Calyx*-lobes lanceolate, acute *Corolla*-tube slender, dilated forwards, 3 in long, white, 2 lipped lobes rounded, crimson or violet purple edged with white, with yellow streaks in the throat *Stamens* rather thick, sinuate, white anthers reniform *Ovary* cylindric, pubescent, stigma cordate *Capsule* cylindric, acuminate, 3.5 in long Ridley in Journ Str Br R As Soc No 43, 47

PAHANG Kota Glanggi, Tahan Woods, Ridley 2144 2151 SELANGOR Pahang Track, 15th mile, Ridley 8559

30 DIDYMOCARPUS ATROSANGUINEA, Ridley in Trans Linn Soc Ser 2, III 328 (1893) *Stem* woody, 6 in high, 2.5 in thick *Leaves* lanceolate, acute, crenulate, denticulate or dentate, base broad 9 in long, 4 in wide deep green velvety pubescent above, glaucescent, pubescent beneath with elevated nerves and nervules *Peduncles* 3 in long pubescent bracts ovate *Calyx* lobes linear, acute 2.5 in long, pubescent, red *Corolla* pubescent, deep red, yellow in the mouth tube 2 in long, dilated upwards lobes subequal, ovate obtuse *Stamens* 2, filaments sinuous, rather thick anthers semi-ovate *Style* longer than the stamens pubescent, stigma rounded Ridley in Journ Str Br R As Soc No 43, 47

PAHANG Tahan Woods, Ridley TRINGGANU Ridley

31 DIDYMOCARPUS HIRUTA, Ridley in Journ Str Br R As Soc No 43, 48 (1905) *Stem* woody, over 1 ft long, branched, densely hairy above with long multicellular hairs *Leaves* alternate, lanceolate acuminate, narrowed to the base, crenate, densely hairy on both surfaces, 6 in long, 1.5 in wide, petiole 5 in long or less *Flowers* solitary on the peduncles in the lower and upper axils *Peduncles* very slender, hairy, 1 in long *Calyx* lobes short, ovate lanceolate, obtuse *Corolla* narrow, 1.5 in long, yellow, pubescent *Capsule* very narrow, cylindric, pubescent, 3 in long

PERAK Goping, *King's Collector* 715, Larut Hills, *King's Collector* 2529

32 DIDYMOCARPUS BOMBYCINA, Ridley in Journ Str Br R As Soc No 43, 32 (1905) *Stem* branched, woody, 3 to 4 ft tall, above closely silky pubescent *Leaves* lanceolate acuminate, 4 to 6 in long, 1 in across, narrowed to the base, minutely crenulate, densely silky pubescent on both sides, nerves very numerous and close *Pedicels* short, 1 in long, slender, silky *Calyx* lobes ovate, acute small, silky *Corolla* tube 1 in long, sparingly pubescent, white tinged with pink or blue, trumpet shaped

PERAK Ulu Buhong 400 to 600 ft, *King's Collector* 10587

33 DIDYMOCARPUS CRINITA Jack in Mal Misc I II 1 (1820) and in Trans Linn Soc XIV 33, t 2 fig 2 (1823) *Stem* woody pubescent, 6 in tall *Leaves* narrow lanceolate acute narrowed to the base shortly and closely serrate 6 in long 1 in wide dark green above, sometimes with a white longitudinal bar, covered closely with short velvety hair beneath purple with longer hair especially on the nerves *Peduncles* about 1 in long villous *Pedicels* 25 in long bracts linear all villous *Calyx* lobes narrow lanceolate acute villous 125 in long *Corolla* white or usually pale blue 15 in long pubescent tube narrowed at the base dilated forwards lobes large rounded, subequal *Stamens* filaments filiform curved anthers oblong with short lateral processes *Style* and *ovary* cylindric pubescent stigma discoid *Capsule* slender, cylindric, 2 to 3 in long pubescent Calc Journ Nat Hist IV 53, t 15 fig 2 Wall Cat 779 Spreng Syst II 837 Gr Don Gen Syst Dichl Pl IV 659 R Br in Benn Pl Jav Ru 118, and in Ann Sc Nat 2 XIII 164 DC Prodr IX 265 Hook Bot Mag t 4554 Fl des Seires, t 631 Lem Jard Fl t 87 Miq Fl Ind Bat II 724 Clarke in DC Monog Phan V 193 and in Hook f Fl Br Ind IV 351 Ridley in Journ Linn Soc XXXII 505 and in Journ Str Br R As Soc No 43 49 *Henckelia crinita* Spreng Syst curae post 13

KEDAH Gunong Jerai, *Ridley*, Tomoh, *Machado* KILIANFAN Kwala Lebu, *Dr Grimmette* PINANG Wallich Helfer 3834 *Gaudi chaul* 71 West Hill *Curtis* 410, *Stoliczka* G King Deschamps PERAK Larut Hills, *Scortechini* 10294, *Ridley* 2907 *King's Collector* 2157, Tapa, *Curtis* 3781 SELANGOR Ginting Bidu, *Ridley* 7577 SUNGAI UJONG Bukit Sulu, *Cantley* PAHANG Raub Track, *Machado* 11575, Tahan Woods, *Ridley* 2169 MALACCA Mangay (K D) 1225 *Harvey* SINGAPORE *Walker* 18 *Lobb* 311 — DISTRIB Sumatra Borneo

VAR *Curtisii*, *Ridley* *Leaves* oblanceolate, acute, serrate, deep green

with a silvery central bar, covered with long multicellular hairs from a swollen base on both sides, very dense and longer on the back at the base and on the buds. *Scapes* 3 in long, hairy, slender. *Calyx*-lobes oblong, hairy, blunt. *Corolla* 2 in long, blue, tube hairy, swollen upwards, lobes unequal, 1 in across the limb. *Stigma* broad, heart-shaped.

SELANGOR near the Gap, *Curtis*

VAR *elongata*, Ridley. *Stem* tall and somewhat branched. *Leaves* scattered, narrow and small, 3 in long, 5 in wide, hairy. *Flowers* small, pale blue, 1 in long, on slender pedicels 3 in long or less, from the lower as well as from the upper axils.

PERAK Tapah, *Curtis* 3781

34 DIDYMOCARPUS FASCIATA, Ridley in Journ Str Br R As Soc No 43, 50 (1905). *Stem* woody, 6 to 8 in tall, with soft hair in the upper parts. *Leaves* alternate, narrowly lanceolate, acuminate, narrowed to base 4 to 8 in long, 1.5 in wide margins serrulate crenulate above deep velvety malachite green, with a broad central white bar covered with short scattered hairs. back, edges, and petiole with longer pale silky hairs. *Peduncles* slender, short, 1.5 in long, hairy. bract very small linear. *Calyx* lobes narrow, lanceolate, very small. *Corolla* 1.5 in long, cylindric, trumpet shaped, white limb edged violet. *Capsule* very slender, 2 in long or less, glabrous.

KEDAH Gunong Jerai, Ridley. PAHANG Tahan River, in rocky woods, Ridley 2169. —DISTRIBUTION Lingga, Batu Gajah (*Hullett*)

35 DIDYMOCARPUS VINUSTA Ridley in Journ Str Br R As Soc No 43, 51 (1905). *Stem* erect, woody, 12 to 18 in tall. *Leaves* oblong lanceolate, subacute, crenulate serrate narrowed into the petiole winged to the base, 4 to 6 in long, 1 to 2 in wide nerves elevated on both surfaces, 22 pairs glabrous above, nerves and midrib ferruginous hairy beneath. *Peduncles* axillary 1 or 2 in an axil, 7 in long, hairy. flowers terminal, 2, large, white. bracts 2, oblong cuspidate glabrous, 3 to 4 in long. pedicels hairy, lower one 2.5, upper one 5 in long. *Calyx* lobes free to base, linear acuminate, pubescent, 5 in long. *Corolla* pubescent, tube enlarged upwards, infundibuliform, 1.5 in long pure white with a brown spot on the lower lobes. upper lobes shorter than lower, rounded, lower lip 5 in long, lobes oblong. *Stamens* included, 2, filaments filiform. anthers oblong. staminodes filiform, hooked. *Ovary* narrow, cylindric, with style 5 in long all pubescent, stigma large, cordate. *Capsule* terete, acuminate, splitting along the upper edge, glabrous, 2 to 2.5 in long.

PERAK Bujong Malacca Ridley. SELANGOR Gunong Semangko, *Curtis* 3751

Ridley says this beautiful plant hardly belongs to this group. It resembles much more closely a *Didissandra*, but has 2 stamens only.

Sect V SALICIN\*

36 *DIDYMOCARPUS DENSIFOLIA*, Ridley in Journ Str Br R As Soc No 43, 51 (1905). Stem woody, 3 in tall. Leaves numerous, crowded, alternate lanceolate, acuminate, narrowed to the base, rather thick in texture, entire, nearly glabrous when adult except for a few hairs on the midrib, 1.5 to 5 in long, .25 to .75 in wide. Peduncles hairy, slender, 3 in long, with a few 1 flowered short branches. Bracts linear, oblong. Calyx lobes linear oblong, pubescent. Corolla not seen. Ovary cylindric, pubescent, style pubescent. Stigma small, capitate. Capsule cylindric, pubescent, 1 in long, splitting nearly to the tip.

JOHORE Gunong Janeng, Kilsall

37 *DIDYMOCARPUS SALICINA*, Ridley in Trans Linn Soc Ser 2, III 329 (1893). A small shrubby plant, 3 to 6 in tall, simple or branched, glabrous below, pubescent above. Leaves numerous, crowded above, opposite, narrowly lanceolate, acuminate, glabrous beneath, 3 to 4 in long, 1.5 in wide, pale green above, reddish beneath. Petiole slender, 1.5 in long or less. Peduncles numerous, crowded in the upper axils, very slender, glabrous, red, 2 in long. Branches few divaricate, pubescent. Flowers very small, 1.25 in long, pink. Calyx lobes very narrow, linear, pubescent. Corolla campanulate, lobes ovate acute. Stamens 2, filaments short, slender. Anthers reniform. Style longer than the corolla, glabrous, stigma small capitate. Capsule cylindric, acuminate, .75 in long. Ridley in Journ Str Br R As Soc No 43, 52.

PAHANG Tahan River, Ridley 2166. On stream banks in woods.

38 *DIDYMOCARPUS SERRATIFOLIA*, Ridley. Stem woody, 6 in long or less. Leaves numerous, lanceolate acute, narrowed at base, not petioled, strongly toothed, teeth 1.25 in long, acute, nerves 40 pairs, 8 in long, 1 in wide, glabrous above, midrib with pale hairs beneath. Scape slender, hairy, 3 in long, flowers 4 or 5, nearly sessile. Calyx lobes ovate, short hairy. Corolla trumpet shaped, .75 in long, narrowed at base, dilated upwards, lower lip longer than upper one, .25 in wide, 3 lobed, side lobes rounded, median longer, oblong, white stained with purple outside, yellow in the mouth. Capsule very slender, over 1 in long, pubescent, pedicelled. *D. serrata*, Ridley in Journ Str Br R As Soc No 43, 52, not of R Br.

PERAK Larut Hills on rocks in dense forest, below the Tea Gardens, at about 1000 ft alt, Ridley 11922.

39 *DIDYMOCARPUS PECTINATA*, Clarke in Herb Kew, ex Oliver in Ic Pl t 2246 (1892) Small shrubby plant, 6 in or more tall, branched or simple *Leaves* densely crowded at the top, glabrous, deeply pectinate, 6 to 7 in long, lobes 4 in long, 125 in wide at the base, blunt *Peduncles* from the upper axils several, pubescent, 2 in long *Calyx* "dark blue" *Corolla* white, tomentose, 3 in long, tube cylindric, slightly inflated, upper lobe obovate, rounded *Stamens* 2, filaments curved, anthers oblong, staminodes absent *Disk* tubular *Capsule* 5 to 75 in long, pale, glabrous, rather thick, curved Ridley in Journ Str Br R As Soc No 43, 53

PERAK on limestone rocks at 400 to 800 ft alt, King's Collector 10711 SELANGOR Rawang, Ridley 7579 Kelsall 1981

#### Sect VI ACAULES

40 *DIDYMOCARPUS VIOLACFA*, Ridley in Journ Linn Soc XXXII 509 (1895) *Rootstock* short, erect, stem 1 in long, densely woolly *Leaves* numerous, very unequal, ovate to lanceolate, acute, narrowed at the base, oblique, toothed, densely softly hairy 2 to 8 in long, 125 to 25 in wide sessile or petioled, petiole as much as 2 in long *Panicles* 2 to 5 in long, lax, branches slender pubescent *Calyx* lobes oblong, lanceolate, 125 in long, glabrous *Corolla* tube trumpet shaped, curved, 5 in long, violet upper lobes short recurved, lower ones 25 in longer *Stamens* 2 filaments filiform *Ovary* long, terete, style short, stigma clubbed *Capsule* glabrous, cylindric, 75 in long

PERAK Hermitage Hill at 5000 ft elevation, on rocks in the stream, Ridley 2909

41 *DIDYMOCARPUS LACUNOSA*, Hook f Bot Mag t 7236 (1892) Stemless *Leaves* crowded, oblong or ovate cordate, tomentose crenulate 2 to 4 in long 15 to 3 in across above pubescent, beneath rusty tomentose, especially on the elevated nerves, petiole 2 to 4 in long, rusty tomentose *Scapes* 4 to 6 in long, 2 to many flowered, simple or 3 or 4 branched at the top branches 5 in long flowers nodding *Corolla* 1 in long, deep violet blue tube narrow at the base, gibbous inflated upwards, lobes short, rounded subequal *Stamens* included, curved, swollen near the base, narrowed upwards, anthers elliptic, not horned, staminodes filiform, one third as long *Pistil* linear, pubescent, gradually narrowed into the style, stigma very shortly bifid *Capsule* 2 in long, linear Ridley in Journ Str Br R As Soc No 43, 54

KEDAH Lankawi island, at Terutau, on damp rocks, Curtis 1655

42 *DIDYMOCARPUS PERDITA*, Ridley in Journ Str Br R As Soc No 43, 54 (1905) *Stem* creeping, woody, about 4 in long *Leaves* elliptic obtuse, rounded, peltate, margins crenulate, 3 in long, 1.5 in wide, above scabrid and sprinkled over with hairs, beneath glabrous except for the midrib and nerves, which are hairy with appressed hairs, margin with hairs on the crenulations, petiole 1 to 2 in long, hairy *Peduncles* slender, 4 in long, subterminal, hairy *Calyx* lobes lanceolate, pubescent *Corolla* not seen *Capsule* 5 in long, narrowed suddenly into the style and only splitting as far as the base of the style, stigma subbilobed, large

SINGAPORE Selitar, very rare, Ridley

Ridley found two plants of this together in a small ravine near Selitar in 1889, one in fruit. Since then the locality has been destroyed by cultivation and the plant has disappeared and is probably extinct

43 *DIDYMOCARPUS PUNCTICULATA*, Ridley in Journ Linn Soc XXXII 510 (1895) Almost stemless *Leaves* crowded, elliptic or obcuneate or newly oblanceolate, inæquilateral, base truncate, crenate, puncticulate, hispid 3 in long, 1.5 in wide or smaller, nerves beneath elevated, hairy *Peduncles* subterminal, 3 in long, slender, thickening in fruit, hairy *Calyx* lobes lanceolate, acute, 0.6 in long, hairy *Corolla* 2.5 in long, hairy, violet, tube short, broad campanulate, lower lip longer than the upper one, lobes oblong obtuse *Stamens* very short, filaments thick, anthers large, comic, shield shaped, style longer, pubescent *Capsule* 5 in long, thick, hispid

JOHORE Gunong Pantu, Ridley

44 *DIDYMOCARPUS HETEROPHYLLA*, Ridley in Trans Linn Soc Ser 2, III, 329 (1893) *Stem* short with a long woody root, woolly above *Leaves* crowded very variable in size, obovate oblique or lanceolate, crenulate, obtuse, 4 in long, 1.5 in wide or less, above dark green, purplish in the centre, glabrous, beneath reddish, nerves raised, covered with red wool on the back *Peduncles* slender, hairy, 3 in long, branches short and few, flowers few, small *Calyx* lobes linear, pubescent, 1.25 in long *Corolla* campanulate, 2.5 in long, violet, pubescent *Style* longer, pubescent *Capsule* cylindric curved, acuminate, 1 in long, glabrous, splitting for nearly the whole length Ridley in Journ Str Br R As Soc No 43, 56

PAHANG Tahan River, Ridley 2170 JOHORE Gunong Janeng, Kelsall

45 *DIDYMOCARPUS PUMILA*, Ridley in Journ Str Br R As Soc No 43, 56 (1905) *Stem* slender, woody, 1 to 3 in long *Leaves* crowded at the top, elliptic obovate, obtuse, narrowed at the base and



inæquilateral, 5 to 15 in long, 25 to 1 in wide, above silky pubescent, beneath dotted with swollen hair-bases, nerves about 6 pairs, elevated, hairy with appressed hairs. *Peduncles* slender, erect, purple, with silky appressed white hairs, 2 to 3 in tall, subterminal, flowers 1 to 2, terminal, very shortly pedicelled, bract linear, purple. *Calyx*-lobes linear, purple, pubescent. *Corolla* 25 in long, with a short broad tube, pubescent, purplish-white, hardly bilabiate, lobes rounded, pinkish white. *Stamens* 2, filaments slender, short, filiform. *Ovary* slender, cylindric, style longer than stamens, stigma discoid. *Capsule* 75 in long, terete, upcurved, splitting along the upper edge, minutely pubescent.

SILANGOR the Gap—Semangko Pass, alt 3000 ft, *Curtis* 3782, *Burn Murdoch*

#### AFFINITY DOUBTFUL

46 DIDYMOCARPUS LILACINA, Ridley in Trans Linn Soc Ser 2, III 330 (1893). *Stem* 12 to 15 in long, entirely leafy, brown pubescent. *Leaves* alternate, spreading, lanceolate, crenate dentate, pubescent, dark green 4 in long, 1 in wide, petiole 1 in long. *Pedicels* numerous rising from the petiole near the leaf blade, slender, 25 in long, pubescent. *Calyx*-lobes very short, lanceolate, hispid. *Corolla* campanulate, rosey violet, sparingly pubescent, lobes oblong, rounded. *Stamens* 2, filaments thick, with slender base, anthers reniform. *Style* shorter than the corolla, pubescent, stigma capitate. *Capsule* 65 in long, rather thick, cylindric, with a short beak. Ridley in Journ Str Br R As Soc No 43, 57.

PAHANG Tahan River, *Ridley* 2165

#### 5 CHIRIHA, Buch —Ham

Herbs or slender shrubs. *Leaves* opposite, often unequal or whorled or alternate, elliptic or ovate. *Peduncles* axillary, 1 or more flowered, bracts free or connate, small or large. *Calyx* 5 lobed, with acute lobes, usually large. *Corolla* infundibuliform or tubular ventricose, blue or white, 2 lipped, lobes rounded. *Stamens* 2, filaments filiform geniculate, anthers rounded, connivent, often hairy. *Disk* annular. *Ovary* cylindric, linear, style usually long, stigma ovate or narrow, bifid. *Capsule* long, cylindric.—*DISTRIBUTION* Species about 26, in India, China, and Malaya.

Bracts free —

Stems 2 ft high, leaves ovate, corolla 1 in long, claret coloured

Stems under 2 ft high, corolla blue or violet, rarely white

1 *C. elata*

Leaves ovate:—

Corolla 1·5 in. long, azure blue, stems 1 ft. high or more .. 2. *C. caliginosa*

Corolla 75 in. long, violet with darker streaks; stems

under 1 ft high .. .. 3. *C. viola*.

Leaves lanceolate, corolla blue, rarely white .. 4. *C. sericea*.

Bracts connate; leaves ovate; corolla blue or violet —

Corolla-tube ·5 in. long .. .. 5. *C. rupestris*

Corolla-tube 1 in. long . . . . 6. *C. Glasgowii*

DOUBTFUL SPECIES

7. *C. mollissima*

1. *CHIRITA ELATA*, Ridley in Journ. Linn. Soc. XXXII. 518 (1895).  
A tall rough herb, 2 ft. high. Stem angled, branched. Leaves 3 to 6 in. long, 1·5 to 3 in. wide, ovate, inæquilateral, acute, toothed, with elevated nerves, hispid, petioles slender, 1 in. long. Cymes lateral, axillary, 3 in. long, hispid. Calyx-lobes lanceolate acuminate, hairy, 125 in. long. Corolla funnel-shaped, hairy, 1 in. long, claret colour, lobes short, rounded, subequal, 5 in. across. Stamens 2, filaments slender, anthers oblong, staminodes short, with abortive anthers. Ovary short, pubescent, stigma peltate, sub-bilobed. Capsule straight, cylindric. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 57.

PERAK Larut Hills, Wray 2985, Curtis 2038, Ridley 2911

2. *CHIRITA CALIGINOSA*, Clarke in DC. Monog. Phan. V. 1. 122 (1883).  
A soft herb, 1 ft. or more tall, often branched. Leaves opposite, ovate acuminate, base broad or cuneate, very inæquilateral, margins entire or slightly toothed, 2·5 in. long, 1 to 2 in. wide, closely pubescent, petiole 5 in. long. Flowers several, axillary, pedicels 1 to 1 in. long, pubescent. Calyx-lobes lanceolate acuminate, hairy, 5 in. long. Corolla 1·5 in. long, azure blue, tube narrow at the base, broadly infundibuliform at the apex, pubescent, lobes large, rounded, 75 in. across the lips. Stamens 2, anthers globose, covered with long hairs at base. Style slender, pubescent, stigma bilobed, lobes linear. Capsule 3 in. long, slender, cylindric, curved. Clarke in Hook. f. Fl. Br. Ind. IV. 360, Ridley in Journ. Linn. Soc. XXXII. 516, and in Journ. Str. Br. R. As. Soc. No. 43, 58.

PERAK Kuala Dipang, Curtis 3109, Batu Kuran, Scortechini 1582  
SELANGOR Kuala Lumpur caves, Beccari, Curtis 2359

3. *CHIRITA VIOLA*, Ridley in Journ. Linn. Soc. XXXII. 516 (1895).  
A herb, 2 to 10 in. tall, pubescent. Leaves ovate acute, crenate or serrate or entire, very unequal, 2 to 6 in. long, 1·5 to 3 in. wide, petiole 125 in. long. Cymes short, few-flowered, flowers small, pedicels 5 in. long. Calyx-lobes lanceolate, acute, hispid, nearly 125 in. long. Corolla 75 in. long, violet, tube narrow at the base, thin, dilated,

trumpet shaped, upper lobes short, rounded, lower ones ovate obtuse, longer, median one longest, elliptic, all violet with darker streaks and a patch of yellow glandular hairs in the mouth *Stamens* 2, exsert, anthers yellow, ovoid, with a thickened connective, ciliate at the base, with a black spot on each anther, filaments attached to the mouth of the tube *Ovary* pubescent, stigma obliquely bifid, lobes linear, obtuse *Capsule* terete, acute, 1.5 in long, minutely pubescent Ridley in Journ Str Br R As Soc No 43, 59

KEDAH Lankawi Islands, *Curtis* 2570 — *DISTRIB* S Siam, on limestone rocks

4 *CHIRITA SFRICEA*, Ridley in Journ Str Br R As Soc No 43, 59 (1905) Herb, 3 to 6 in tall, simple or branched, woolly *Leaves* alternate, lanceolate, acute or acuminate base unequal, cuneate, 2 to 3 in long, 5 in wide margins entire, both sides densely covered with short silky hairs *petiole* .25 to 1 in long *Flowers* 1 to 2, axillary, pedicels 5 in or less, silky hairy bracteolate *Calyx* lobes narrow, linear acuminate, densely silky hairy *Corolla* blue, rarely white tube half as long again as sepals lobes broader, unequal, oblong, all hairy *Style* slender, glabrous stigma bilobed, lobes elliptic *Capsule* cylindrical, 1.5 in long, silky hairy

PERAK Ipoh, limestone rocks, *Curtis* 3131

VAR *Scortichinii* Ridley, *l.c.*

*Capsule* shorter, 5 in long, and thicker, 1.25 in through, splitting longitudinally into 2 valves *Corolla* tube straight, lobes of lower lip broad

PERAK *Scortichinii* 102, 112

5 *CHIRITA RUFI-STRIS*, Ridley in Journ Str Br R As Soc No 43, 59 (1905) A herb, about 4 to 10 in tall *Stem* simple or branched, glabrescent *Leaves* opposite or alternate, thin ovate obtuse 1 to 3 in long, 5 to 2.5 in wide, above sprinkled with multicellular hairs *Flowers* axillary, 1 to 2, sessile, on a peduncle 5 in long, hairy, enclosed in a green cupular bilobed bract 5 in long, edges recurved and covered with multicellular hairs *Calyx*-lobes narrowly lanceolate, hairy, nearly 5 in long *Corolla* tube as long as the bract, hairy, blue, little longer than the calyx lobes, rounded *Ovary* and style slender, hairy *Capsule* cylindric, slender, curved, 2.5 in long

KEDAH Lankawi, on damp rocks, *Curtis* 2120

6 *CHIRITA GLASGOVII*, Ridley in Journ Str Br R As Soc No 43, 60 (1905) A weak herb, 1 ft tall, branched *Leaves* ovate obtuse, thin, 1 to 3 in long, .75 to 2 in wide, base rounded, retuse, nerves 5 pairs, alternate, above sprinkled with multicellular hairs, beneath paler with a few hairs on the nerves, otherwise nearly glabrous, petiole

slender, 1 to 2 in long, glabrous *Bract* convolute, bilobed, lobes ovate, hairy, 1 in long *Calyx*-lobes lanceolate acuminate, narrow, hairy, 5 in long *Corolla* tube 1 in long, minutely hairy, dark violet *Capsule* cylindric, curved, 3 in long, glabrous

PERAK Waterloo near Kuala Kangsa, *C Robertson-Glasgow*

#### DOUBTFUL SPECIES

7 *CHIRITA MOLLISSIMA*, Ridley in Journ Linn Soc XXXII 517 (1895) Nearly stemless *Leaves* congested, lanceolate, acute, obscurely minutely serrate, silvery-tomentose, 6 to 8 in long, 1 25 to 2 in broad *Flowers* pedicelled, drooping, axillary, few, handsome, pedicels somewhat thick, woolly, 1 in long *Calyx* lobes lanceolate, acuminate, equal 5 in long, tomentose *Corolla* funnel shaped, more than 1 in long, oblong, obtuse, the upper lobes short, rounded, violet, the lower wider, the tube white in the throat, with glandular hairs above the anthers *Stamens* 2, filaments broad curved, anthers broad, thick *Pistil* pubescent, emerald green, little exsert, the ovary cylindric, attenuated in the style, stigma 2 lobed, pubescent, decurved *Capsule* 1 in long, broad, thick, glabrous or pubescent

SIAMER STATES Pangah, *Curtis* 2944

#### 6 *TI TRAPHYLLUM* Griff

Undershrubs, stem elongate with leaves crowded towards the apex *Leaves* opposite or in whorls of 4, nearly sessile, ovate, unequal sided *Cymes* capitate or lax from the axils of the upper leaves, bracts elliptic, oblong or lanceolate *Calyx* somewhat large, 5 parted, obscurely 2 lipped *Corolla* widely funnel-shaped, more or less 2 lipped, lobes 5, subequal, ovate *Stamens* 2, fertile, filaments short, filiform, often spirally twisted, anthers 2-celled apex subincurvate, cells oblong or ellipsoid, parallel or divergent, staminodes very minute *Ovary* ellipsoid, acute, style linear, stigma small, capitate, sub-bilobed, placenta parietal, 2 lamellate, ovules very numerous *Capsule* ovate or lanceolate, dehiscing both loculicidally and septically, having 2 ribs united at the tip and the placenta split into 2 lamellae *Seeds* very minute, ellipsoid, testa reticulate — *DISTRIB* 2 species, one Indian, the other of the Malay Peninsula

*TI TRAPHYLLUM ROSFUM*, Stapf ex Ridley in Journ Linn Soc XXXII 524 (1895) *Leaves* opposite, closely approximate, the end ones subverticillate, usually in fours, elliptic or obovate elliptic, obtuse at apex, narrowed at base, crenate denticulate, above green, shining, bullate, pilose, beneath pale, punctulate, pilose on the nerves, 2 5 to 3 5 in long, 1 75 to 2 25 in broad, petiole 1 5 to 2 in long

*Cymes* few-flowered, from the axils of the last 3 or 4 leaves, collected in a terminal inflorescence 1 in long, bracts oblong or lanceolate, pedicels slender, about 2 in long. *Calyx* deeply 5-fid, scarcely .5 in long, lobes ovate acute, tube obscurely 5-angled, glabrous. *Corolla* glabrous, tube nearly 5 in long, white, curved, limb pink, bilabiate, upper lip erect, 2-lobed, lower lip 3 lobed, lobes rounded. *Stamens* included, filaments filiform, spirally twisted, glabrous, anthers adhering at the apex, with a thick connective, cells oblong, divergent at base. *Ovary* oblong, puberulous, style as long as ovary, stigma capitate, sub-bilobed, placenta 2 lamellate, the lamellæ densely ovule-bearing. *Capsule* ovate-oblong, 3 to 5 in long, as long as the persistent calyx.

SIAMESE STATES Pungah, *Curtis*

#### 7 LOXOCARPUS, Br

Herbs scapigerous. *Leaves* ovate or oblong, petiolate, pubescent. *Flowers* 1 or more in a peduncled cyme, blue. *Calyx* lobes 5, free to base or nearly so. *Corolla* campanulate, small hardly bilabiate, lobes rounded. *Stamens* 2 filaments short, thick, sinuate, anthers reniform, large. *Ovary* oblong, style longer than stamens, stigma capitate. *Capsule* follicular, conic, dehiscing along the upper edge. — **DISTRIB** Species 7, of the Malay Peninsula and Borneo

Flowers 1 or 2 on slender silky scapes 2 to 2.5 in long. 1 *L. semitoria*

Flowers few or numerous on dichotomously branched viscidly

hairy peduncles —

Peduncles 2 to 4 in long flowers few or numerous, capsule ovoid

2 *L. incana*

Peduncles 6 to 12 in long flowers numerous capsule corniculate ..

3 *L. carulea*

1 **LOXOCARPUS SEMITORIA** Ridley in Journ Str Br R As Soc No 43, 61 (1905) Stemless. *Leaves* numerous ovate or oblong, obtuse, rather thick, base broad 3 to 1 in long, .25 to .75 in wide above green silky, beneath with thick red woolly raised nerves, petiole 1 to 2.5 in long, thick, red woolly. *Scapes* slender, 2 to 2.5 in long, silky. *Flowers* 1 or 2. *Calyx* lobes lanceolate, hairy, .125 in long. *Corolla* .5 in long tube broad, oblique, pale blue with violet streaks in the throat lobes very short and indistinctly marked. *Stamens* filaments short curved, anthers reniform purple. *Ovary* and style hairy, shorter than corolla, larger than stamens. *Capsule* .25 in long, horn shaped, acuminate with the persistent style, base swollen. *Didymocarpus semitoria*, Clarke in DC Monog Phan V 1 99, and in Hook f Fl Br Ind IV 352

**MALACCA** Mount Ophir, *Griffith* (K D) 3836, *Maingay* (K D) 1220, *Ridley* 3184, and all collectors On rocks in the stream "The Mount Ophir Violet"

2 *LOXOCARPUS INCANA*, R Br in Benn Pl Jav Rar 115, 120 (1840), and Ann. Nat Sci XIII 2, 167 Stemless Leaves ovate, cordate, serrulate, subacute, silky tomentose above and beneath, 1 to 3 in long, 75 to 15 in wide, petiole 75 to 1 in long Peduncles 2 to 4 in long, above dichotomously branched, viscid hairy, flowers few or numerous Calyx-lobes lanceolate, pubescent, hairy, white tinted green Corolla-tube straight, thick, upper lobes oblong, recurved, lower lobes oblong, blue Filaments straight Pistil conic, style stout, stigma capitate Capsule ovoid, tip upcurved, hairy Miq Fl Ind Bat II 737 *L. alata*, A DC Prodr IX 277 *Didymocarpus incana*, Benth and Hook f Gen Pl II 1022, Clarke in DC Monog Phan V 98, and in Hook f Fl Br Ind IV 352, *Ridley* in Journ Linn Soc XXXII 5121 and in Journ Str Br R As Soc No 43, 62 *Loronia* ? *alata*, Wall Cat 809

**PENANG** Government Hill, Waterfall, *Curtis* 297, *Maingay* (K D) 1228, *Wallich* 809 **PERAK** Hermitage Hill, *Ridley*, Bujong Malacca, *Ridley* 9782 **SELANGOR** Bukit Kutu, *Ridley*

3 *LOXOCARPUS CÆRULFA*, *Ridley* in Journ Str Br R As Soc No 43 62 (1905) Stemless or nearly so Leaves several, ovate, base cordate, serrate, inaequalateral 2 to 6 in long, 15 to 4 in wide, silky hairy above, tomentose beneath petiole 2 to 8 in long, pubescent Peduncles 6 to 12 in tall, viscid hairy, cymes compact or branched with 2 or 3 branches 2 in long, flowers numerous, bracts lanceolate, narrow Calyx lobes lanceolate, narrow, shorter than the tube Corolla pubescent, 2 lipped, 4 in long and wide, tube short, broad, campanulate, upper lobes oblong obtuse, lower ones truncate, median one longer, blue with a violet mouth Stamens exsert filaments suddenly thickened in the middle, sigmoid, anthers connate, deep violet Style slender Capsule 4 to 5 in long, lanceolate acute, horn shaped, upcurved, viscid *Didymocarpus cærulea*, *Ridley* in Journ Linn Soc XXXII 513

**PERAK** Larut Hills, at 5000 ft alt, *Ridley*, *King's Collector* 6990, *Scortechini* 1427, Gunong Bubu, *Wray* 3809 **SELANGOR** Bukit Hitam, *Kelsall*

#### 8 PARABOLA, *Ridley*

Herbaceous plants or with a shrubby stem Leaves usually in a rosette, tomentose or hairy Flowers small, white or pink, in simple or paniced cymes, peduncle usually long Calyx small Corolla white

explanate, campanulate, with a very short tube, distinctly 2-lipped or nearly regular, lobes equal, oblong or unequal, blunt *Stamens* 2 fertile filaments thick, short anthers large, 2-celled, connivent by the tips *Disk* none *Ovary* sessile style longer than the stamens, stout stigma small, capitate *Capsule* straight, narrow, slender, not twisted, splitting longitudinally *DISTRIB* — Species about 20 Siam-Malaya

Corolla tube campanulate — Sect I CAMPANULATE —

Corolla 5 in long —

Flowers many in large spreading panicles, leaves sparingly  
mid opposite

1 *P. cordata*

Flowers solitary or few on slender peduncles —

Peduncles subterminal, leaves opposite ovate —

Leaves hairy on margins and on midrib and nerves  
beneath peduncles 1 flowered

2 *P. campanulata*

Leaves quite glabrous peduncles branched dichoto-  
mously branches 1 flowered

3 *P. Scortechinii*

Peduncles axillary, leaves crowded at apex of stem  
lanceolate

4 *P. corulea*

Corolla under 5 in long flowers few crowded

5 *P. pyroliflora*

Corolla tube not campanulate very short — Sect II BREVIFLORE —

Corolla lobes equal or subequal, if slightly 2-labiate the  
lower lip hardly longer than the upper —

Flowers in compact umbels or cymes on pedicels 5 in  
long or less at the apex of the peduncles —

Leaves not purple beneath in a basal rosette stem 0 —

Flowers umbellate pedicels 5 in long, leaves ochre  
yellow beneath

6 *P. capitata*

Flowers in compact scorpioid cymes leaves pale  
beneath

7 *P. ferruginea*

Leaves purple beneath crowded at the apex of a short  
stem flowers umbellate pedicels 25 in long

8 *P. regularis*

Flowers at the apex of slender cyme branches 1 to 3 in  
long —

Leaves ochreous tomentose beneath in a basal rosette  
stem 0

9 *P. polita*

Leaves red woolly beneath stem 2 in long

10 *P. vulpina*

Corolla lobes distinctly unequal these of lower lip  
longer than those of upper —

Calyx lobes lanceolate, leaves obovate coarsely toothed  
dull green, corolla 25 in across

11 *P. lara*

Calyx lobes oblong or linear oblong obtuse —

Leaves oblong elliptic, sparsely hairy, corolla 5 in  
across

12 *P. Curtisi*

Leaves obovate, arachnoid on both sides, yellowish  
beneath, corolla 25 in across

13 *P. obovata*

1 *PARABEA CORDATA*, Ridley in Journ Str Br R As Soc No 43, 64 (1905) A tall herb, 2 ft high, stem pubescent *Leaves* opposite, ovate acuminate, inæqualateral at base, dentate sparingly hispid above and beneath nerves 10 pairs, hairy beneath, 6 to 7 in long 4 in wide, petiole 1 in long *Peduncles* stout, 6 to 8 in long, pubescent, bearing a spreading panicle 4 to 6 in long, bracts in pairs at the base of each bifurcation, ovate, glabrous, 125 in long, pedicels slender, 5 in long, glabrous *Calyx*-lobes lanceolate, free to base, glabrous, 5 in long *Corolla* campanulate, 5 in long, white tinted violet lobes short, equal, rounded, with 2 rows of glands on each *Stamens* 2, filaments short, anthers subglobose large staminodes minute *Ovary* slender, glabrous *Capsule* sausage shaped 4 angled, 1.5 in long glabrous rather thick, splitting on two sides *Seeds* minute, deep red, oblong *Dulymocarpus cordata*, Jack R Br Benn Pl Jav Ru 119, Ann Sc Nat 2 XIII 164 Wall Cat 781 DC Prodr IX 265 Miq Fl Ind Bat II 726 Clarke in DC Monog Phan V 84, t 9 and in Hook f Fl Bi Ind IV 350 Ridley in Journ Linn Soc XXXII 514

PENANG *Wallch* 781 *Mamgay* (K D) 1224 *W Lor* *Curtis* 452 PERAK Lirut Hills *Scortchini* 296 400 *Ridley* 2913 10682, *King's Collector* 2227, 2331, 6378 Common on rocks at 2000 to 6000 ft alt

*VAR debilis*, Ridley Rhizome fleshy stem 6 in tall, pubescent *Leaves* thin, ovate oblique base obtuse apex acute or subacute margin crenate dentate sparingly hispid, 1.5 to 4 in long, 1 to 2 in long *Panicle* 4 to 6 in long, glabrous, weak, few branched, branches short and thin, bracts ovate flowers smaller

KLDAH Gunong Jorai, *Ridley*

*VAR ophurensis*, Ridley

Tall and weak *Leaves* thin, lanceolate subacute or acute, narrowed at the base 6 in long, 2 in wide *Panicle* weak glabrous bracts lanceolate flowers smaller white *Capsule* smaller curved 4 in long

MALACCA Mount Ophir, on a big cliff in the forest below Padang Batu, *Ridley* 3183

2 *PARABEA CAMPANULATA*, Ridley in Journ Str Br R As Soc No 43, 65 (1905) *Stem* slender, herbaceous, 1 ft tall shortly hairy *Leaves* opposite, in distant pairs, elliptic acute, entire or obscurely crenulate, above glabrous except the edge fringed with multicellular hairs, beneath glabrous except the midrib and elevated nerves about 12 pairs, scurfily hairy, 2.5 to 3.5 in long, 1.25 in wide, petiole scurfy hairy 125 to 375 in long *Peduncles* subterminal 1.5 in long, 1 flowered, rufous-hairy, bracts 2, alternate, linear, minute, pedicel 5 in *Calyx*-lobes linear, hairy, 125 in long *Corolla* campanulate, 5



in long, apparently white, lobes broad, rounded *Stamens* 2, very short, anthers subglobose *Style* slender, pubescent *Capsule* (unripe) cylindric, velvety, 75 in long, including the style

SELANGOR above the Gap on the road to the Sempang mine, 3000 to 4000 ft, *Curtis*—a single specimen

A very distinct plant of a weedy habit, with solitary flowers of the type of *P. cordata*

3 *PARABEA SCORTECHINII*, Ridley in Journ Str Br R As Soc No 43, 66 (1905) *Stem* herbaceous, glabrous *Leaves* opposite, ovate acuminate base rounded, inaequalateral, margins crenate, quite glabrous, nerves 8 pairs 3 to 3.5 in long, 1 to 2.5 in wide, petiole 5 in long *Peduncle* slender, erect, subterminal, 3 in long, glabrous, branches dichotomous, few, 1 in long flowers solitary on the ends of the branches *Calyx* lobes free almost to the base, oblong obtuse, 125 in long, glabrous, fleshy *Corolla* campanulate, 5 in long, glabrous, lobes rounded *Anthers* broad, elliptic, filaments very short

PERAK *Scortechini* (no number or locality)

A single incomplete specimen The plant is allied to *P. cordata* of which it has quite the flowers, but is quite glabrous

4 *PARABEA CÆRULÆA*, Ridley in Journ Str Br R As Soc No 43, 66 (1905) *Stem* woody, 3 to 4 in long, 125 in through *Leaves* crowded at the top, narrowly lanceolate, linear acuminate, narrowed gradually to the base, 4 to 5 in long, 25 in wide, above dark green, newly glabrous midrib prominent, beneath pale cinnamon colour, nerves about 30 pairs joined at the tips *Peduncles* slender, axillary, 4 in long pubescent 1 to 2 flowered *Calyx* lobes linear, 125 in long, obtuse *Corolla* campanulate, 5 in long and nearly as wide at the base, pubescent, base pale, lobes deep blue, rounded *Stamens* 2, filaments very short, sigmoid anthers broad, rounded, oblong *Style* fairly stout stigma heart shaped *Capsule* very narrow, cylindric, 1 in long

TRINGGANU Bunch, *E. Hostado* The upper part of the stem among the leaves is covered with silvery hairs

5 *PARABEA PYROLIFLORA*, Ridley in Journ Str Br R As Soc No 43, 67 (1905) *Stem* woody, 3 in tall or more, pubescent *Leaves* alternate, ovate or ovate lanceolate, acuminate at both ends, 3 to 4 in long, 1.5 in wide, entire, bright green, silky pubescent above beneath paler, petiole over 1 in long, pubescent *Peduncles* several from the upper axils, erect, 3 to 4 in long, shortly hairy *Calyx* lobes lanceolate, short pubescent *Corolla* campanulate funnel shaped, white, 4 in

long, lobes short, rounded *Stamens* 2, filaments short and thick, anthers large, elliptic *Style* thick, curved upwards, longer than the corolla, stigma very small, capitate *Capsule* spreading, 1 in long, terete, terminated by rather a long style, glabrous *Didymocarpus pyroloflora*, Ridley in Trans Linn Soc Ser 2, III 330

PAHANG Tahan river woods, Ridley 2164

6 *PARABETIA CAPITATA*, Ridley in Journ Str Br R As Soc No 43, 67 (1905) Stemless or with a stout rootstock *Leaves* in a rosette orbicular, base rounded, subpeltate, 6 in long, 5 in wide bright green, glabrous above, ochre yellow beneath, tomentose, nerves raised reticulate, petiole stout, 2 in long *Peduncle* slender, 8 in tall, flowers numerous in an umbel on the top with 2 broad, blunt, oblong bracts, 25 in long, below *Pedicels* 5 in long *Calyx* campanulate, lobes linear, oblong obtuse, 3 in long, green, hairy *Corolla* 5 in across lobes subequal, rounded, white *Filaments* very short straight anthers reniform *Style* curved up, longer than corolla, white *Capsule* spreading, linear, straight, beaked, 1.5 in long

PERAK Buiong Malacca, Curtis 3215, Kamuning, Machado On limestone rocks

VAR *oblongiflora*, Ridley *Leaves* oblong, narrowed at the base

PERAK Kuala Dipang and Sungai Siput, Curtis 3107, Tambun Ridley 9832, Batu Kuran, *Scortichini* 1581, Goping, King's Collector 456, 4325

7 *PARABETIA FERRUGINEA*, Ridley in Journ Str Br R As Soc No 43, 68 (1905) Stemless or nearly so *Leaves* in a rosette, ovate cordate, obtuse, crenulate above covered with scattered hairs, below tomentose with longer hairs, paler, nerves elevated 3 in long, 2.5 in wide, petiole 1.5 to 2 in long *Peduncles* 3 in long, ferruginous tomentose, cyme compact, scorpioid, ferruginous hispid *Calyx* lobes as long as the corolla, green, ferruginous hispid lanceolate *Corolla* tube very short limb explanate, not bilabiate lobes broad, obovate obtuse, subequal and similar, white or tinted with rose *Stamens* 2, short, filaments broad, spatulate, thick, apex 3 toothed anthers conic, connate by the tips *Ovary* conic, stigma rounded, entire, discoid

KEDAH Lankawi, on damp rocks, Curtis 2566

8 *PARABETIA REGULARIS*, Ridley in Journ Str Br R As Soc No 43, 68 (1905) Stem woody, 1.5 in long *Leaves* crowded at the top, very unequal, oblong-lanceolate, obtuse, base cuneate, inequilateral margins crenulate, dark green, glabrous above, purple, minutely tomentose beneath, with elevated nerves, 3 in long, 1.5 in wide, petiole 1.5 in long, tomentose *Peduncles* slender, pubescent, 1 in long, branches

very short and slender, 25 in long, umbelled, brown-tomentose, bracts lanceolate, obtuse, flowers few, very small, very shortly pedicelled. *Calyx* lobes lanceolate, brown-tomentose, as long as the corolla-tube *Corolla* hardly 25 in across, white, lobes oblong, obtuse, equal, not bilabiate *Stamens* 2, filaments sigmoid, thick, anthers rounded, ovoid *Style* longer than stamens, stigma capitate *Capsule* 5 in long, cylindric, scabrid, rather thick, straight *Didymocarpus regularis*, Ridley in Journ Linn Soc XXXII 515

KRDAH Lankawi Islands, *Curtis*

9 *PARABCEA POLITA*, Ridley in Journ Str Br R As Soc No 43, 69 (1905) Stemless *Leaves* in a rosette, ovate, crenate, obtuse, base rounded, above deep shining green, beneath ochreous tomentose, with nerves and nervules reticulate, 1 to 8 in long, 4 to 4.5 in wide, petiole 4 in long *Peduncle* over 1 ft long, slender, with brown ochreous fur, branches few, 3 in long, umbellate, bracts linear, oblong obtuse, brown woolly, pedicels 25 in long *Calyx*-lobes linear, green, 125 in long *Corolla* sub bilobed, 5 in across, white, back tinted pink, lobes rounded *Stamens* 2, filaments thickened at the base, anthers orange, reniform *Style* stout, pink at base, white above, stigma capitate

PERAK Bujong Malacca, *Curtis* 3214 part

Ridley thinks it is perhaps a hybrid between *P. capitata* and *P. vulpina*

10 *PARABCEA VULPINA*, Ridley in Journ Str Br R As Soc No 43, 69 (1905) *Stem* 2 in long, thick, covered with red wool *Leaves* elliptic, rounded at each end, crenulate, above sprinkled with pale multicellular hairs, beneath covered densely with branched rufous hairs arranged stellately nerves beneath strongly elevated 6 pairs reticulations elevated, 1.5 to 3 in long, 1 to 2 in wide, petiole 1 to 3 in long, densely red-woolly *Peduncles* slender, 6 to 8 in long, red, with a few branched hairs branches slender, 1 to 3 in long, trichotomous, bracts very small, linear, obtuse, glabrous *Calyx* lobes narrow, linear, glabrous *Corolla* white, 25 in across, lobes rounded, subequal *Stamens* 2, anthers very large, reniform *Style* short, thick *Capsule* cylindric, narrow, glabrous

PERAK Bujong Malacca *Curtis* 3214, Hot Springs, Ipoh, *Curtis* 3132 On limestone rocks

11 *PARABCEA LAXA*, Ridley in Journ Str Br R As Soc No 43, 70 (1905) *Stem* very short, woody, thickly brown-tomentose *Leaves* obovate, coarsely crenate-serrate, narrowed at the base into the winged petiole, 3 to 7 in long, 2 to 3 in wide, dull green, densely hairy, tomentose on both surfaces *Peduncle* slender, 5 to 6 in long, terminated by a much-branched umbel of slender branches 3 in long, pedicels

slender, 125 in long, flowers numerous, bracts very small *Calyx* shortly 5-cleft, lobes lanceolate, short, green *Corolla* 125 in across, white or tinted rosy, upper lobes broad, oblong, recurved, lower lip shortly trifid, central lobe broadest *Filaments* short, swollen in the middle, anthers yellow, reniform *Style* longer than stamens *Capsule* linear, cylindric, straight, 5 in long, tipped with the elongate style

KFDAH Lankawi at Kwah, *Curtis* 2571

12 *PARABOLIA CURTISII*, Ridley in Journ Str Br R As Soc No 43, 70 (1905) Stemless *Leaves* oblong, elliptic, crenate, obtuse, 6 in long, 25 in wide, above sprinkled with hairs, petiole rufous-hairy, 15 in long *Scapes* 10 in long, rufous tomentose, bearing an umbel of 4 or 5 branches at the top about 2 in long, bracts at base of umbel oblong, obtuse, 25 in long, pedicels short, rufous tomentose *Calyx*-lobes linear, oblong, obtuse, hairy, 125 in long *Corolla* 5 in across, white, buds tinted pink, tube very short limb bilobed, upper lobes short, rounded lower lobes larger *Stamens* filaments very short, thick, curved, anthers reniform, triangular *Style* much longer than stamens, bent *Ovary* cylindric, stigma wide, discoid *Capsule* (unripe) cylindric, acuminate, straight

PERAK Bujong Malacca, *Curtis* 3214

13 *PARABOLIA OBOVATA* Ridley in Journ Str Br R As Soc No 43, 71 (1905) *Stem* short *Leaves* crowded at the top, thin, obovate, blunt, base cuneate 3 in long, 15 in wide, thinly arachnoid on both surfaces, beneath yellowish, petiole 25 in long *Peduncle* slender, 3 to 6 in long, glabrous branches few, terminal bracts narrowly oblong, obtuse *Calyx* lobes oblong, obtuse, glabrous *Corolla* 25 in across, lower lip longer than upper one lobes oblong, rounded *Stamens* 2, anthers reniform filaments short and thick *Style* short and thick, stigma capitate

KFDAH Lankawi, Gunong Chinchang, *Curtis* One specimen only seen

## 9 BFA, Commers

Herbs or shrublets with a woody stem *Leaves* opposite or whorled, generally on the back *Peduncles* axillary, usually elongate, laxly or compactly cymose or paniced, bracts small, flowers large or small, blue or white *Calyx* of 5 narrow sepals *Corolla* widely campanulate, with a short tube usually distinctly 2 lipped, lobes ovate, obtuse *Stamens* 2, perfect, with short curved thick filaments, anthers ovoid, coherent, cells ovoid *Disk* absent *Ovary* sessile, style as long, glabrous above, stigma small, capitate *Capsule* slender, cylindric or

fusiform-cylindric, when ripe spirally twisted *Seeds* minute — **DISTRIB**  
Species about 22 in India, Siam, China, and Malaya

Corolla limb 1 5 in across, blue, sepals pubescent ..	..	1	<i>B. paniculata</i>
Corolla limb less than 1 in across —			
Calyx lobes more or less pubescent —			
Stems 1 ft or more in height —			
Corolla blue —			
Leaves white beneath . . . . .	..	2	<i>B. verticillata</i>
Leaves yellowish brown beneath . . . . .	..	3	<i>B. caerulea</i>
Corolla white . . . . .	..	8	<i>B. suffruticosa</i>
Stems under 6 in in height —			
Leaves arachnoid above, corolla rose pink . . . . .	.	5	<i>B. lanata</i>
Leaves glabrous above . . . . .	.	6	<i>B. acutifolia</i>
Calyx lobes glabrous —			
Leaves arachnoid above, corolla white with pink mouth . . . . .		4	<i>B. elegans</i>
Leaves glabrous above —			
Corolla pale lilac . . . . .	..	7	<i>B. divaricata</i>
Corolla white . . . . .		9	<i>B. parviflora</i>

## DOUBTFUL SPECIES

10 <i>B. pitens</i>	11 <i>B. glabra</i>	12 <i>B. ferruginea</i>
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1 *B. PANICULATA*, Ridley in Journ Linn Soc XXXII 519 (1895)  
*Stem* base woody, 4 in or more long, 5 in thick, above a rosette of leaves upper part of stem 1 ft or more long, stout, deeply grooved, white arachnoid branches numerous, whorled, erect, 6 in long, covered with brown wool *Leaves* crowded in a rosette at the top of the woody portion of the stem, lanceolate acuminate, narrowed for a long distance at the base, 6 in long, 1 in wide, above grey arachnoid, beneath greyish white with cinnamon coloured raised nerves *Flowers* numerous pedicels 5 in long bracts 4 or 5 at each whorl of branches, leafy *Calyx* lobes short, lanceolate, pubescent, 125 in long *Corolla* tube very short limb 1 5 in wide, blue, lobes large, rounded, unequal *Filaments* short and thick, 25 in long *Style* curved, as long as stamens *Capsule* 75 in long, thick Ridley in Journ Str Br R As Soc No 43, 72

SFLANGOR limestone rocks, Kuala Lumpur, Kelsall and Ridley 1970, 1976 and 8226 PERAK Sungai Siput, Curtis 3105, Kuala Dipang, King's Collector 8271, Batu Kuran, Scortechini 1611 A superb plant growing in the cracks of limestone rocks

2 *B. CAUVERTICILLATA*, Ridley in Journ Linn Soc XXXII 519 (1895)  
*Stem*-base woody, 3 in or more long, nearly 25 in in diameter, above herbaceous, 1 5 ft tall, 4-angled, white arachnoid with branches whorled, each whorl 3 in or less apart *Leaves* whorled, lanceolate acuminate, narrowed at the base into a petiole, 4 in long, 75 in wide or more,

above grey-arachnoid, beneath white-arachnoid with raised nerves  
*Flowers* numerous, blue, bracts leafy, 25 to 5 in long *Calyx*-lobes lanceolate subulate, arachnoid, 125 in long *Corolla* 5 in wide, lobes rounded *Stamens* very short, anthers pear-shaped *Style* much longer than stamens, straight *Capsule* fusiform, acuminate, 5 in long  
 Ridley in Journ Str Br R As Soc No 43, 73

SELANGOR limestone rocks at Kuala Lumpur, *Kelsall, Ridley* 1975, 8551

3 BGA CÆRULFSCENS, Ridley in Journ Str Br R As Soc No 43, 73 (1905) Whole plant over 2 ft tall, upper part of stem stout, grooved, woolly *Leaves* oblanceolate, subobtusate, narrowed to the base above dark green, densely pubescent, beneath ochreous covered with felted wool, 6 to 8 in long, 1.25 to 2 in wide, petiole winged to the base or not *Panicle* 2 ft or more long, large, branches whorled, yellow woolly, bracts below leaf-like, above linear, narrow, yellow *Calyx* lobes lanceolate, woolly *Corolla* tube very short limb 75 in across, pale blue, upper lobe shorter, lobes rounded, lower lip unequally lobed, longer, central lobe longest *Stamens* 2, anthers reniform, conic, large, filaments short, curved *Style* bent on the cylindric ovary, pubescent, stigma large, discoid *Capsule* thick, glabrous, 75 in long

PERAK Sungai Siput, *Curtis* 3137, Kinta, *King's Collector* 7175, 7062, 8276

4 BDA ELEGANS, Ridley in Journ Linn Soc XXXII 522 (1895) *Stem* about 6 in long, woody, decumbent, 125 in thick, arachnoid *Leaves* whorled in threes, 5 to 3 in apart, lanceolate acute, narrowed to the base, 1 to 2.5 in long, .25 to .5 in wide, above grey arachnoid, beneath cinnamon arachnoid *Peduncles* from the upper axils, slender, glabrous, 6 in long, cyme terminal, 3 in long, with few slender branches *Calyx* very short, lobes lanceolate, glabrous *Corolla* 5 in across, with broad rounded lobes, white-pink in the mouth *Anthers* oblong *Style* rather short, stigma clubbed *Capsule* 1 in long, glabrous, linear, acuminate Ridley in Journ Str Br R As Soc No 43, 74

KEDAH Gunong Jerai on granite precipices, *Ridley*

5 BGA LANATA, Ridley in Journ Linn Soc XXXII 520 (1895) *Stem* short, stout, woody, 2 in long, curved, with white wool *Leaves* crowded, lanceolate acuminate, narrowed into the petiole, arachnoid above, densely woolly beneath, 3 in long, .75 in wide, petiole woolly, 3 in long, winged to base *Panicles* few, branched, axillary, dense, 1 to 5 in long *Calyx* as long as the corolla-tube, lobes lanceolate, woolly outside *Corolla* thin, 5 to .75 in across, glabrous, rose-pink,

lobes rounded *Anthers* subglobose. *Style* thick. *Capsule* .5 in. long, thick, glabrous. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 74.

KEDAH Langkawi, Dayong Bunting, on limestone rocks, *Curtis* 2569

6 *BCEA ACUTIFOLIA*, Ridley in Journ. Linn. Soc. XXXII. 519 (1895) *Stem* woody, 3 in. or more long, .25 in. through; internodes .5 in long *Leaves* crowded at the top, oblanceolate, acute, narrowed to the base, 6 in. long, 1.5 in. wide, above glabrous dotted, beneath cinnamon-arachnoid *Panicles* axillary, 6 in. long, peduncles arachnoid, branches short, slender *Calyx*-lobes 3, lanceolate, acute, .125 in. long, arachnoid *Capsule* cylindric, acute, glabrous, .75 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 75

KEDAH Langkawi, Gou Chinta, *Curtis* 2791

7 *BCEA DIVARICATA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 75 (1905) *Stem* about 4 in tall, thick and woody *Leaves* in a rosette on the top, oblanceolate, crenulate, obtuse, narrowed into a winged petiole, nerves and nervules beneath elevated, 15 pairs, above glabrous, beneath covered with a thin brownish tomentum, 7 in. long, 2.5 in. wide. *Peduncles* rather stout, terete, smooth, 7 to 16 in tall, branches umbellate, decomposed, 1 ft or more long, pedicels of flowers .2 in. long, covered with brown fur *Calyx*-lobes lanceolate, acute, green, glabrous, shorter than the corolla-tube *Corolla* .25 in across, pale lilac, tube short, dilated, limb bilabiate, lobes rounded *Stamens* *anthers* connate, rounded with acute bases, filaments thick, sigmoid *Style* slender, stigma horseshoe-shaped *Capsule* cylindric, strongly twisted, 1 in long

KEDAH Langkawi, Ayer Hangat, *Curtis* 3683

8 *BCEA SUFFRUTICOSA*, Ridley in Journ. Linn. Soc. XXXII. 518 (1895) A branching shrub, 1 to 2 ft tall, with rather slender branches .125 in through, angled, slightly arachnoid *Leaves* scattered, lanceolate, subacute, narrowed at the base, 3 in long, .5 in. wide, above nearly glabrous, punctate, beneath covered with brownish tomentum, nerves conspicuous, petiole .25 to .5 in. long. *Panicles* axillary, dense, 1 in long, with short branches brownish-woolly, buds brown-woolly. *Calyx* longer than the corolla-tube, lobes linear, lanceolate, thick, tomentose outside *Corolla* .25 to .35 in across, white, lobes short, oblong, rounded *Anthers* oblong, obtuse. *Capsule* fusiform, very thick, .25 in. long, tipped with the long style. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 76.

KEDAH Langkawi, on a small island north of Kwah, *Curtis* 3682, 2565

9 *BCEA PARVIFLORA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43,

76 (1905). *Stem* slender, shrubby, branching, covered with ferruginous tomentum. *Leaves* lanceolate, acuminate, base cuneate, unequal, 4 in long, 1 to 1.25 in wide, above glabrous, beneath covered with rusty wool, nerves elevated, 11 pair. *Peduncle* 6 in long, slender, glabrous, panicle umbellate, of 6 slender branches in a terminal whorl, branchlets glabrous, numerous, slender, bracts very narrow, linear, flowers very small, numerous, white, pedicels slender, 1.25 in. *Calyx* lobes lanceolate, glabrous, 5. *Corolla* very small, white, tube very short, upper lobes subacute, lower ones oblong. *Anthers* large, reniform. *Style* shorter than anthers. *Capsule* very slender, cylindric, 2.5 in long, terminated by the slender style.

PERAK Hot Springs, at Ipoh and Sungai Siput, not common, *Curtis* 3134, Kinta, *King's Collector* 7108. On limestone rocks.

## DOUBTFUL SPECIES

10 *BŒA PATENS*, Ridley in Journ Linn Soc XXXII 520 (1895). Almost stemless. *Leaves* rosulate, oblong, obtuse, serrulate crenulate, inæquilateral, 4 to 6 in long, 2 to 3 in broad, upper surface softly pubescent, lower pale ferruginous tomentose. *Petiole* 1 in long. *Peduncle* stout, terete 18 in long, softly ferruginous lanate, branches long, divaricate, 2 forked, primary bracts oblong, 2.5 in long, secondary smaller, cymules scorpioid, few flowered. *Flowers* small, white, 1.25 in broad. *Pedicels* .06 in long. *Calyx* lobes free to the base, short, lanceolate, acute, glabrous. *Corolla* campanulate, glabrous, lobes 2 oblong obtuse, 3 ovate obtuse, shorter and broader. *Stamens* with short slender curved filaments as long as tube, *anthers* large, oblong. *Pistil* glabrous, ovary cylindric, attenuated into a slender little exsert style. *stigma* small, scarcely dilated. *Capsule* 5 in long, glabrous, very slender.

SIAMSF STATES Pungah, *Curtis*

11 *BŒA GLABRA*, Ridley in Journ Linn Soc XXXII 521 (1895). A succulent, glabrous herb. *Stem* short, 1 to 2 in long. *Leaves* undulate, ovate-rotundate, inæquilateral, 6 in long, 3.5 in broad or broader, *petiole* 1 to 2 in long thick, upper leaves smaller, opposite. *Peduncles* subterminal, 3 to 4 in long, thick. *cymes* terminal, congested, scorpioid, 5 in long, *pedicels* short. *Calyx* tube short, conical, lobes 5, equal, obtuse, truncate, 1.25 in long. *Corolla* white, 5 in broad, lobes rounded, obtuse. *Stamens* 2, filaments sigmoid, broad at the base, attenuate above, *anthers* oblong, acute on both sides, rather large. *Style* cylindric, thick, glabrous, curved; *stigma* scarcely thickened, obliquely ovate.

SIAMSF STATES Pungah, *Curtis* 3039



12 *Bœa ferruginea*, Ridley in Journ Linn Soc XXXII. 521 (1895) Stemless or with a short thick stem, roots large and thick. *Leaves* many, congested, spreading, ovate, cordate, obtuse, crenulate, upper surface clothed with sparse hairs, lower green, paler, tomentose, the raised nerves clothed with long hairs, when dry somewhat black above, ferruginous-tomentose beneath, blade 3 in long, 2.5 in broad, petiole 1.5 to 2 in long. *Peduncles* 3 in long, ferruginous-tomentose, cyme scorpioid, ferruginous hispid. *Calyx*-lobes linear lanceolate, as long as the corolla, green, ferruginous-hispid. *Corolla* 3 to 5 in broad, white or pink, spreading, lobes broad, equal, obovate-obtuse, tube very short. *Stamens* 2, short, filaments broad, spatulate, 3-toothed at apex, anthers yellow, conical, cuneate at the tips. *Ovary* conical, attenuate in a short, curved, cylindric, narrowed style, stigma rather broader, flat, entire.

KIDAH Langkawi Island, on damp rocks, *Curtis* 2566

Ridley remarks that, not having seen the fruit, he is uncertain as to the genus

#### 10 *Phyllobœa*, Benth

Herbs or half shrubby plants. *Leaves* opposite, petioled. *Cymes* pedunculat, many flowered, bracts large, conspicuous, flowers large, pink or blue. *Calyx* large, 2 lipped, one lip 2 lobed, the other 3-lobed or of 3 large connate sepals. *Corolla* broadly campanulate, 2-lipped, 3- to 5 lobed. *Stamens* 2, short, anthers large, rounded. *Capsule* lanceolate, at length twisted.—*DISTRIB* Species 2, one Burmese, one Malayan.

*Phyllobœa speciosa* Ridley in Journ Linn Soc XXXII 522 (1895) A shrub, 1 or 2 ft tall, stems white tomentose. *Leaves* in distant pairs, lanceolate acuminate, 6 in long, 1.5 in wide, above glabrous, beneath white arachnoid. *Petiole* 1 in long. *Peduncle* stout, lateral, erect, nearly a foot tall, flowers sessile, scattered. *Bracts* ovate, lanceolate, 5 in long, white arachnoid. *Calyx* of 3 sepals, connate, ovate, oblong, woolly, 4 in long. *Corolla* 1 in long, blue, tube broad, lobes 3, two oblong truncate, the third much broader. *Stamens* short, not longer than the ovary. *Style* long, woolly. *Capsule* 1 in long, lanceolate, cylindric, acuminate, woolly.

KIDAH Langkawi, common on limestone rocks on the small islands, *Curtis* 2564

#### 11 *Bœica*, Clarke

Herbs or half shrubby plants with the habit of *Bœa*. *Leaves* oblong, elliptic or lanceolate, more or less tomentose or hairy. *Inflorescence* racemose or panicle, axillary, flowers small, lilac or white. *Calyx* 5-rid. *Corolla*-tube very short, lobes subequal, rounded. *Sta-*

*mens* 4, filaments very short, anthers rounded, connivent *Style* curved, larger than the stamens *Capsule* linear cylindric — **DISTRIB** Species 4 or 5, in Assam, Burma, and the Malay Peninsula

Ridley says "Most of the few described species are based on flowerless specimens, and are all very similar and closely resemble *Bea diaricata* in habit, but the capsule is straight and not twisted. The type species, however (*B. filiformis*, Clarke), has 4 stamens instead of 2. The Malayan one described below differs from these in habit, and I have seen no fruit, but there is no other genus to which it can be referred on account of its 4 very short stamens arranged in a circle round the pistil. The only other genus allied to it is *Platystemma*, a Himalayan plant with distinctly 2-lipped flowers."

**BELICA BRACHYANDRA**, Ridley in Journ Str Br R As Soc No 43, 78 (1905) Stemless *Leaves* obovate, serrate, hairy, dark green, obtuse 3 in long by 1.5 in wide, nerves 6 or 7 pair, covered beneath with long red hairs back of leaf punctate *Scape* short few flowered about 3 in long, hairy, unbranched *Calyx* lobes free nearly to base, linear, hairy, green, nearly as long as corolla-lobes *Corolla* tube very short, lobes broad rounded, oblong, explanate, subequal, pale lilac, about 5 in across *Stamens* 4, filaments very short, anthers broad, waxy, subglobose, connivent round the pistil *Style* longer than stamens, slender, curved, white *Capsule* cylindric, narrow, 1 in long, scabrid, straight, on pedicels elongated to 5 in

**KEDAH** Langkawi, Gunong Chinchang, at Kwala Malacca, *Curtis*

Ridley says this plant was found quite dried up in February, 1899, but was brought in alive and flowered in the Botanic Gardens, Penang

## 12 ORCHADOCARPA, Ridley

Herb or shrublet, with opposite unequal leaves *Flowers* small, blue, racemose or cymose, pedicelled *Calyx* lobes free to base, narrow-lanceolate *Corolla* tube short limb 2-lipped unequally *Stamens* 2, filaments short, exsert, sinuate glabrous, anthers bilobed, reniform, connivent by their edges *Ovary* hairy, oblong, style short, stigma capitate *Capsule* oblong, hairy, enclosed in the sepals — **DISTRIB** One species, Malayan

**ORCHADOCARPA LILACINA**, Ridley in Journ Str Br R As Soc No 43, 78 (1905) *Stem* short to 4 in long, stout, woody *Leaves* crowded at the top, long petioled, thin, ovate or ovate lanceolate, acute, strongly serrate, covered with closely felted short hairs, base broad, in æqualateral, 3 to 7 in long, 1.5 to 3 in wide, petiole slender, 3 to 6 in long *Peduncle* 3 to 4 in long, pubescent, villous, bearing a terminal, pubescent, umbelliform panicle, or simply racemose *Calyx* lobes linear, pubescent, 1 to .2 in long *Corolla* pale lilac-blue, tube very short, limb dis-

tinctly bilabiate, upper lip smaller lobes short rounded, lower lip longer, trifold, median lobe longer than the others, oblong-obtuse, pubescent across *Stamens* 2, filaments from the mouth of the corolla tube, thick, twisted at the top, anthers large, reniform *Ovary* oblong, pubescent, style distinct, stigma very small, capitate *Capsule* short, oblong, hairy, enclosed in the calyx, beaked

PERAK *Scortechini* 406, Gunong Batu Putih, *Wray* 298, 302

### 13 LEPADANTHUS, Ridley, n gen

Herb with fistular stem *Leaves* opposite, petioled, ovate, toothed *Flowers* in axillary or terminal, flexuose, distichous racemes *Calyx*-lobes free nearly to the base, ovate acute *Corolla* as long as calyx, bilabiate, upper lobe much the shorter *Stamens* 2 fertile, anthers elliptic *Ovary* elliptic, style long, stigma oblique, entire *Capsule* as long as calyx lobes, loculicidal, placentæ thick, elevated *Seeds* very minute, warted —**DISTRIB** One species

The plant on which the genus is founded has the habit of *Rhyncotecom*, but the fruit is capsular

[*LEPADANTHUS*, Ridley, gen nov. Herbacea, caule fistuloso *Folia* opposita petiolata ovata dentata *Flores* distichi in racemis axillaribus vel terminalibus flexuosis (*calycis* lobi fere ad basin liberi, ovati acuti *Corolla* calyci aequalis, bilabata labio superiore multo brevior *Stamina* 2 fertilia, anthera elliptica *Ovarium* ellipticum stylo longo, stigmate obliquo integro (*capsula* calycis lobis æquilonga, loculicida placentis crassis elevatis *Semina* minutissima, verrucosa)]

*LEPADANTHUS FLEXUOSA*, Ridley, n sp. A herb, reaching 18 in in height stem hairy, fistular *Leaves* very thin when dry ovate, sub acute, rounded and slightly unequal at base, strongly toothed, 5 in long, 4 in wide nerves about 8 to 10 pair, hairy, petiole slender, 3 to 4 in long *Racemes* several, pubescent, 3 to 4 in long, including the 1 to 1.5 in long peduncle, rachis flexuose with distant alternate flowers on capillary secund pedicels 5 in long, bracts in pairs, linear, deflexed, 12.5 in long *Calyx* lobes 5, ovate, acuminate, pubescent, 3 nerved *Corolla* small, tube short, thick, upper lip bifid, much shorter than the lower, glabrous *Stamens* 2, filaments extremely short, adnate to the corolla tube, anthers elliptic *Ovary* elliptic, style pubescent, as long as calyx lobes or longer, stigma clavate, oblique *Capsule* 25 in long, oblong, glabrous *Seeds* elliptic, dark red

KEDAH inside the caves, Gunong Grenong, *Fox* 3811 (a poor specimen only)

[*L. FLUTUOSA*, Ridley sp nov Herba pubescens caule 40–50 cm alto fistuloso Folia siccitate tenuissima, ovata, subacuta, rotundata, ad basin parum inaequalia, dentata 12 cm longa, 10 cm lata, nervi utrinque 8–10, pubescentes, petiolus gracilis, 7–10 cm longus Racemi plures, pubescentes, cum pedunculo 7–10 cm longi, rhachis flexuosa floribus alternis distantibus pedicellis secundis capillaribus, bractae geminae lineares deflexae, 3 mm longae Calycis lobi 5 ovati, acuminati, pubescentes, trinervi Corolla parva, tubo brevi crasso, labium superius bifidus, inferiori multo brevius Stamina 2, filamenta brevissima, tubo corolla adnata Ovarium ellipticum, stylus pubescens calycis lobis aequilongus vel longior, stigma clavatum, obliquum Capsula 6–7 mm longa, oblonga, glabra Semina elliptica nigro rubra

PENINSULA MALAYANA in Prov Kedah in specibus ad Gunong Grcnong |

#### 14 RHYNCHOGLOSSUM, Blume

Herbs, succulent and nearly glabrous Leaves opposite, thin Raceme terminal, lax, flowers pendent Calyx campanulate toothed or lobed Corolla tube cylindric, narrowed above limb bilobed, upper lobe very short bifid, lower much longer, 3 lobed Stamens 2 perfect, affixed to the middle of the corolla-tube, anthers connivent, cells ellipsoid, parallel, staminodes 2, or absent Disk cylindric Ovary ovoid, glabrous, style longer, stigma dilate Capsule included in the calyx, ellipsoid, membranous, 2 valved Seeds narrowly ellipsoid, smooth —DISTRIB Species 2, in India, Malaya and the Philippines

RHYNCHOGLOSSUM OBLIQUUM, Blume Bijdr 741 (1826) Succulent herb 20 in tall Leaves 1 to 3 in long, 5 to 1 in wide glabrous or nearly so, ovate acuminate petiole 5 in long or less Racemus lax, about 6 in long flowers numerous, pale to deep violet bracteoles filiform, 1 to 2 in long Calyx tubular 25 in long, enlarged in fruit lobes triangular or lanceolate Corolla 6 in long lower lip several times longer than the upper one, subtrilobed Capsule ellipsoid, 3 in long DC Prodr IX 274, Clarke in DC Monog Phan V 161, in Comm & Cyt Beng t 88 and in Hook f Pl Br Ind IV 367, Ridley in Journ Str Br R As Soc No 43, 79 R Blumei, DC Prodr IX 274 Wulffenia intermedia, Wall Cat 408 Lorotis intermedia, Benth Scroph Ind 57 G Don Gen Syst Dichl Pl IV 664 L obliqua, R Br in Benn Pl Jav Rai 102, t 24, Miq Fl Ind Bat II 731, t 35, fig 3

PERAK Larut Hills, Fox, Batang Padang, Wray 1447, at 2000 ft elevation —DISTRIB Tenasserim and Malay Islands

#### 15 EPITHEMA, Blumé

Small rock-herbs, succulent, pubescent, stems simple or branched Leaves few, alternate or opposite above, petioled or sessile ovate, usually cordate Peduncles long, from the upper axils, erect bract

single, ovate or cucullate, flowers small, blue or white, in a scorpioid cyme on short pedicels *Calyx* campanulate, lobes 5, acute *Corolla*-tube short, limb distinctly 2-lipped, lobes acute or obtuse, subequal *Stamens* 2 posterior perfect, 2 anterior ones sterile, shorter, anthers coherent *Disk* unilateral or almost surrounding the ovary *Ovary* ovoid style longer, stigma subcapitate *Capsule* globose, enclosed in the enlarged calyx on a thickened and a longer pedicel, splitting transversely (a pyxis) *Seeds* ellipsoid or oblong, spirally reticulate — **DISTRIB** Species about 6 Asiatic, all very closely allied, and one African

**EPITHEMA SAXATILE**, Blume Bijdr 738 (1826) Succulent herb, 3 to 12 in tall, stem viscid, pubescent *Leaves* very variable, opposite, ovate cordate, denticulate or crenulate, hairy, 1.5 to 6 in long, 1 to 5 in across, petiole .25 to .15 in long *Peduncle* 1 to 2 in long, viscid, cyme .75 in across, subtended by a broad sessile truncate denticulate bract, flowers numerous, subsessile *Calyx* viscid, pubescent, tubular, split about half-way down into 5 narrow lobes .25 in long *Corolla* tube as long, straight, white, three upper lobes oblong, obtuse, tipped with violet, lower two connate, broader, subovate, denticulate, thinner, pellucid, tipped mauve with darker central spots, mouth of tube inside hairy *Stamens* 4, in 2 pairs, filaments incurved, adnate to the mouth of the tube, white, anthers 2, oblong, connate, yellowish *Ovary* ovoid, enclosed in a fleshy truncate yellow disk, style stout, glabrous, stigma capitate *Capsule* globose, pubescent, surrounded by the much enlarged ovate acute sepals and borne on the thickened elongate to 1.25 in pedicel, circumsciss *Seeds* very numerous, brown, elliptic fusiform, spirally ribbed DC Prodr IX 278, Miq Fl Ind Bat II 736 Zoll Verz Ind Archip 55, Clarke in DC Monog Phan V 178, Ridley in Journ Str Br R As Soc No 43, 80

KIDAH Langkawi Islands, *Curtis* 2107 PERAK Telor Pinang Ipoh *Ridley* Batu Kuran, *Scortechini* 1580, *Krug's Collector* 10941, Sungai Riah, *Kunstler* 283, Gopeng, *Krug's Collector* 5872 SELANGOR Kuala Lumpur Caves, *Ridley* 8217 PAHANG Kota Glanggi, *Ridley* —**DISTRIB** Java, Borneo, Sumatra On limestone rocks

## 16 MONOPHYLLÆA, R Br

Succulent herbs with an unbranched stem and one large herbaceous cordate ovate sessile leaf *Peduncles* numerous, from the leaf-base, with racemose or cymose inflorescence, flowers small *Calyx* deeply 5-cleft, lobes elliptic, obtuse *Corolla* small, usually white, tube short, cylindrical, limb distinctly 2-lipped, lobes 5 *Stamens* 4 perfect, filaments

short, anthers cohering in pairs or altogether *Disk* unilateral or a complete ring *Ovary* 1-locular, style short, stigma capitate *Capsule* membranous, enclosed in the enlarged calyx, irregularly splitting *Seeds* oblong, minute, reticulate — **DISTRIB** Species 7, of the Malay Peninsula and Islands, and Siam

Leaf glabrous, calyx lobes not spreading in fruit

Calyx lobes ovate, rounded, flowers white

1 *M. Horsfieldii*

Calyx lobes lanceolate, acute, flowers white and brown

2 *M. glabra*

Leaf strigosely hairy calyx lobes spreading in fruit

3 *M. patens*

1 **MONOPHYLLÆA HORSFIELDII**, R Br in Benn Pl Jav Rar 121 (1840), and Ann Sc Nat 2, XIII 160 *Stem* 6 in to 1 ft tall *Leaf* ovate cordate, 6 to 12 in long, 1 to 12 in wide glabrous, glaucous beneath *Racemes* 2 to 7, often stout, 9 in long flowers numerous, subsucculent, pedicels 25 in long, glabrous *Calyx* lobes glabrous, rounded, ovate, ribbed *Corolla* tube short, cylindric upper lip 2-lobed, lower 3 lobed, lobes rounded, white *Stamens* 4, didynamous, glabrous, anthers connate *Style* short, glabrous *pistil* subglobose *Capsule* globose, enclosed in the enlarged calyx lobes *Seeds* oblong, brown, reticulate, very numerous DC Prodr IX 274 Miq Fl Ind Bat II 731, Clarke in DC Monog Phan V 182, and in Hook f Fl Br Ind IV 370, Ridley in Journ Str Br R As Soc No 43, 82

**SELANGOR** Kuala Lumpur Caves, *Curtis*, *Buccari* **PERAK** Gopeng, *Ang's Collector* 413, 515 — **DISTRIB** Sumatra Batu Panti (Forbes 2660), Java (*Jobb*) On limestone rocks

2 **MONOPHYLLÆA GLABRA**, Ridley in Journ Str Br R As Soc No 43, 82 (1905) *Stem* succulent, 6 in to 1 ft tall *Leaf* ovate cordate, obtuse, glabrous, glaucous beneath, 25 to 6 in long, 2 to 6 in wide *Racemes* slender, glabrous, 4 to 10, 2 to 8 in long, lax, flowers numerous, in pairs, pedicels slender, 25 in long, spreading, deflexed *Calyx*-lobes 125 in long in fruit, lanceolate, acute, glabrous, not spreading *Corolla* brown and white *Capsule* enclosed in the sepals, cylindric, oblong

**SIAMESE STATES** Kasum, *Curtis* 3219

3 **MONOPHYLLÆA PATENS**, Ridley in Journ Str Br R As Soc No 43, 82 (1905) *Stem* 1 to 4 in long, viscid hairy *Leaf* ovate-cordate to ovate lanceolate, strigose, hairy, 6 in long, 4 to 6 in across *Racemes* slender, 4 to 20, pubescent, 4 to 5 in long, flowers in pairs, pedicels slender, pubescent, 25 in long in fruit *Calyx*-lobes lanceolate, hairy, spreading in a stellate manner in fruit, ribbed *Corolla*-tube short, lobes white *Stamens* 4, glabrous, didy-

namous *Ovary* ovoid, style short, thick, glabrous *Capsule* globose, glabrous *Seeds* numerous, black, tessellated

SELANGOR Kuala Lumpur Caves, *Ridley* 8222, *King's Collector* 7052. PERAK Kinta, *Curtis* 3136, Sungai Siput, *Curtis* 3135, Batu Kuran, *Scortechini* 1574, 1579, Goping, *Kunstler* 449 On limestone rocks

### 17 STAURANTHERA, Benth

Herbs, succulent, pubescent *Leaves* alternate, the opposite ones reduced, falcate, elliptic, acuminate, inæquilateral *Cymes* peduncled, lax, bracts small, flowers medium-sized, showy *Calyx* campanulate, lobes 5 *Corolla* campanulate, rounded, tube short, shortly spurred or gibbous, limb 2-lipped, lobes rounded, nearly equal *Stamens* 4 perfect, anthers connate, bilocular, bases diverging *Ovary* subglobose or ovoid, no disk, style short *Capsule* depressed, globose, irregularly split *Seeds* minute, obovoid-reticulate — **DISTRIB** Species 3 Assam and Malay Islands

Flowers large base of corolla spurred	..	1 <i>S. grandiflora</i>
Flowers small base of corolla not spurred	.	2 <i>S. umbrosa</i>

1 STAURANTHERA GRANDIFLORA, Benth Scroph Ind 57 (1835) Succulent herb with a fleshy stem about 6 in tall *Leaves* 6 in long by 4 in wide or less, oblong, obtuse, crenulate, deep green above, bullate, glabrous, inæquilateral, pubescent on both sides *petiole* 1 in long *Cyme* short, pubescent, 3 in long, with a few (9) large flowers, bracts short, ovate flowers 1.25 in across *Calyx* lobes lanceolate, ovate pubescent *Corolla* tube short and broad, with a short spur at the base, lobes short, broad, rounded, violet with a central yellow bar reaching to the spur *Stamens* subequal, 4, filaments slender anthers connate *Ovary* ovoid style shorter than the stamens, stigma capitate *Capsule* 2 in broad Clarke in DC Monog Phan V 190, and in Hook f Fl Br Ind IV 371 G Don Gen Syst Dichl Pl IV 665 *S. grandifolia*, Dietr Syn Pl III 582, R Br in Benn Pl Jav Rar 121, and Ann Sc Nat 2, XIII 167, DC Prodr IX 278, Hook Bot Mag t 5409 Floral Mag Ser 1 (1866), t 272, Miq Fl Ind Bat II 735 Clarke Comm & Cyrt Beng t 89 *bas*, Ridley in Journ Str Bt R As Soc No 43, 83 *Glossanthis ? grandiflora*, Benth in Wall Cat 6395

PENANG Wallich 6395, rocks near Balik Pulau, *Curtis* PERAK Larut, *King's Collector* 2248 — **DISTRIB** Burma Rare, on rocks

2 STAURANTHERA UMBROSA, Clarke in Comm & Cyrt Beng t 89 (1874) Stem 3 to 6 in tall *Leaves* ovate, oblong, falcate, inæquilateral, strigosely hairy especially beneath, 6 to 8 in long, 2 to 4

in wide *Cymes* spreading, few- to 10-flowered, peduncles and pedicels hairy *Calyx* shortly 5-lobed, cup-shaped lobes triangular, 25 in long in flower, larger and spreading in fruit *Corolla* 5 in long, white with a violet spot in the centre *Ovary* unilocular *Capsule* circumsciss near the base Clarke in DC Monog Phan V 189, and in Hook f Fl Br Ind IV 731, Ridley in Journ Str Br R As Soc No 43, 83 *Cyananthus umbrosa*, Griff Notul IV 154, Ic Pl Asiat t 437

PERAK Telok Pinaang, near Ipoh, Ridley 9773 Kinta, King's Collector 7144 SELANGOR woods at the Kuala Lumpur Caves, Ridley 8224 PAHANG Tahan Woods, Ridley 2183 JOHORE Gunung Pantu, Ridley 4166 —DISTRIB Assam A ground plant in damp rocky woods

### 18 RHYNCHOTECUM, Blume

Shrubs, little branched, young parts red-woolly *Leaves* opposite or alternate *Cymes* axillary, decomposed, flowers small, numerous *Calyx* 5-lobed nearly to the base, lobes narrow *Corolla* small, campanulate, limb 2 lipped, lobes 5 ovate or oblong, subequal *Stamens* 4 perfoct, affixed to near the corolla base, filaments short, curved, anther cells 2, subparallel *Ovary* sessile, ovoid disk very small, annular or absent, style much longer than ovary stigma subcapitate *Berry* small, globose, with persistent style pericarp pulpy *Seeds* very small, smooth —DISTRIB Species 9, Indo Malayani

RHYNCHOTECUM PARVIFLORUM, Blume Bijdr 775 (1826) A little-branched shrub about 3 ft tall, leafy above upper parts ferruginous hairy *Leaves* opposite, lanceolate, acute, cuneate at the base serrate 8 in long, 3.5 in wide, dark green, glabrous above except the midrib, covered with red wool beneath, thickest on the nerves nerves 13 pairs, petiole 1 in long *Cymes* numerous, short, from the lower part of the stem, laxly branched, red-woolly, flowers very small, yellowish white *Calyx*-lobes nearly free to the base, linear lanceolate, acute, woolly, 125 in long *Corolla* little longer than the calyx lobes, campanulate, lobes oblong, obtuse, white *Stamens* 4, very short, filaments short and thick *Style* longer than the ovary *Capsule* ovoid globose, hairy, shorter than the sepals G Don Gen Syst Diehl Pl IV 663, Dietr Syn Pl III 581, DC Prodr IX 285, Zoll Verz Ind Archip (1854) 55, Miq Fl Ind Bat II 750, Clarke in DC Monog Phan V 1 195, and in Hook f Fl Br Ind IV 373, Ridley in Journ Linn Soc XXXII 523, and in Journ Str Br R As Soc No 43, 84 *Isanthera parviflora*, Ridley in Trans Linn Soc Ser 2, III 331

PENANG Walkch, Pulau Betong and Penara Bukit, Curtis 3035,



PERAK Larút Hills, *Ridley*, *King's Collector* 2237, *Scortechini* 1222

PAHANG Kuala Tahan, *Ridley* 2171 —DISTRIB Java, Sumatra

### 19 CYRTANDROMŒA, Zoll

Shrubs with square stems, leafy above *Leaves* opposite, subequal, herbaceous, ovate elliptic or lanceolate, serrate, petioled *Flowers* 1 to many, in axillary or basal cymes, bracts 2 in the middle of the pedicel *Calyx* tubular, shortly 5 toothed or lobed, enlarged in fruit, usually red *Corolla* large, white, tubular, thin, glabrous, tube dilated at apex, lobes rounded, subequal *Stamens* 4 perfect, in 2 pairs, subsimilar, filaments linear, anthers ovoid, small *Pistil* longer than stamens, stigma cup shaped *Capsule* globose or oblong, enclosed in the enlarged calyx, opening irregularly, walls membranous *Seeds* numerous, sinuate, oblong, obtuse, ribbed reticulate DISTRIB Species 10, Malayan

Flowers solitary, axillary, corolla nearly 1 in long

1 *C. acuminata*

Flowers in lax many flowered cymes —

Cymes slightly supra axillary, corolla about 2 in long

2 *C. megaphylla*

Cymes borne on base of stem or on upper portion below the leaves, corolla 1 in long

3 *C. grandis*

1 CYRTANDROMŒA ACUMINATA, Benth and Hook f Gen Pl II 1020 (1876) A shrubby plant, 3 to 4 ft long, stem rather weak, hollow, young parts pubescent *Leaves* lanceolate or ovate, narrowed into the petiole, acute serrate, strigose, pubescent above, also on the nerves beneath, 4 to 6 in long, 2 to 3 in wide, petiole 1 in long *Flowers* solitary, axillary, on short 125 in long, lanceolate, slender, hispid peduncles with 2 very small linear bracts in the middle *Calyx* tubular, 5 in long, glabrous, with short teeth, dull red *Corolla* nearly straight 1 in long tube thick lobes rounded, white *Capsule* oblong, 4 angled, 25 in long *Seeds* minute deeply reticulate Clarke in DC Monog Phan V 1 185, and in Hook f Fl Br Ind IV 370, *Ridley* in Journ Str Br R As Soc No 43, 86 *Cyrtandra?* *acuminata*, Wall Cat 1808 *Busea subsessilis*, Miq Fl Ind Bat II 733

TRINGGANU Bundi, *Rostado* PENANG *Porter* in *Wallich's Collector* 808, *Mamgay* (K D) 1232 2, *King*, *Tonoh*, *Machado* PERAK Larút Hills, *Ridley* 2917, *Scortechini* 83, 329, *King's Collector* 5342, 2139 SELANGOR Ginting Bidai, *Ridley* NEGERI SEMBILAN Bukit Sulu, *Cantley*

2 CYRTANDROMŒA MEGAPHYLLA, Hemsley in Hook Ic Pl t 1555 (1884) Herb about 3 ft tall stem bluntly 4-angled, pithy in the centre, pubescent *Leaves* opposite, subequal, herbaceous, ovate,

acutely acuminate, coarsely serrate, base rounded or subcordate, 6 to 10 in long, 3 in wide, pubescent, petiole 3 to 5 in long. *Cymes* from a little above the axils, lax, many-flowered. *Calyx* tubular, pubescent, shortly 5-toothed, 5 in long, inflated in fruit. *Corolla* about 2 in long, white, obliquely infundibuliform, lobes rounded, subequal. *Ovary* perfectly bilocular. Ridley in Journ Linn Soc XXXII 523, and in Journ Str Br R As Soc No 43, 86.

PERAK. Larut Hills at 2100 ft alt, Wray, *Scortechini* 584, Gunong Batu Putih, King's Collector 8155. SELANGOR. Ginting Peras, Ridley 7602.

3 CYRTANDROMEA GRANDIS, Ridley in Journ Str Br R As Soc No 43, 87 (1905). A large shrub, several feet tall. Base of stem woody, 5 in through, glabrous. *Leaves* opposite, equal, herbaceous, lanceolate acuminate, glabrous, narrowly acuminate at the base, margins dentate, 12 in long, 4 in wide, nerves elevated, 10 pairs, petiole 1 to 1.25 in long. *Cymes* large, lax, borne on the base of the stem, and on the upper part below the leaves, many flowered, 2.5 to 6 in long, pubescent. *Pedicels* 2.5 in long. *Calyx* tubular, pubescent, with linear lobes, red, 5 in long. *Corolla* white, 1 in long, tube straight, thick, lobes rounded. *Capsule* globose, 5 in long, enclosed in the enlarged calyx. *Seeds* minute, black, oblong, ribbed and reticulate.

PERAK. Ulu Bubong, King's Collector 10150, Gunong Batu Putih, King's Collector 8155. SELANGOR. Kuala Lumpur, Curtis, Ridley 10498, 15th mile Pahang Track, Ridley 8552. Bukit Hitam, Ridley 7576.

## 20 CYRTANDRA, Forst

Half-shrubby plants, terrestrial or rarely epiphytic, stems often branched, usually tall. *Leaves* opposite, subequal or one smaller. *Cymes* axillary, on long or short peduncles, many flowered, bracts large or small, free or connate, bracteoles ovate or narrowed or absent. *Calyx* tubular, 2- to 6 lobed, usually 5-lobed, lobes lanceolate. *Corolla* tube short, usually pubescent, infundibular, straight, lobes 5, subequal or more or less distinctly 2 lipped, usually white spotted or marked with yellow-brown or red. *Stamens* 2, perfect, shortly exsert or included, affixed to the corolla, anthers bilocular, connivent, free or coherent, staminodes small, 2 to 3. *Disk* annular or unilateral. *Ovary* ovoid or oblong, style long, filiform, stigma sub bilobed. *Berry* sausage-shaped or ovoid, firmly fleshy, usually beaked with the persistent style. *Seeds* numerous, minute, ellipsoid, smooth or obscurely reticulate. — **DISTRIB.** About 170 species, in the Malay Peninsula and Archipelago eastwards to Polynesia.

## Bracts free —

Leaves of a pair with one usually manifestly smaller than the other, sometimes entirely suppressed, or less frequently (*C pendula*) reduced to a subulate process opposite the perfect leaf —

Leaves 12 in long, their margins strongly toothed especially towards the apex, all quite alternate from suppression of one of each pair, calyx 5 lobed corolla 5 in long

1 *C dispar*

Leaves 7 to 9 in long, their margins entire or occasionally (*C pendula* sometimes) crenate —

Bracts ovate acute, leaves with one of each pair usually smaller than the other and sometimes (*C falcata* often) suppressed entirely, leaf margins always entire, calyx 5 lobed —

Bracts 1 in long, leaves 7 to 9 in long, main nerves about 12 pairs, prominent, both leaves of each pair always present and the two sometimes subequal corolla over 1 in long

2 *C suffruticosa*

Bracts 5 in long leaves 7 to 8 in long, main nerves about 10 pairs, not prominent one leaf of each pair always smaller than the other and sometimes entirely suppressed corolla unknown

3 *C falcata*

Bracts lanceolate acuminate, leaves 8 in long with one of each pair reduced to a subulate process, margins entire or sometimes crenate, calyx 2 fid corolla 1.5 in long

6 *C pendula*

Leaves of a pair always subequal —

Margins of leaves serrate calyx 5 in long, 2 fid, corolla 1 in long

4 *C pilosa*

Margins of leaves crenate, calyx 1.5 in long, 3 fid corolla 1.5 in long

5 *C lanceolata*

Bracts connate in a large white cup, leaves of a pair always subequal

7 *C cupulata*

1 CYRTANDRA DISPAR, DC Prodr IX 282 (1845) Shrub with a stout pale, reticulate, fistular stem, obscurely 4-angled Leaves alternate, obovate oblanceolate, inequilateral, petioled, strongly toothed, especially at the apex, glabrous above, red pubescent beneath, 12 in long, 4 in wide, petiole 1 in long Flowers small, very numerous, in axillary cymes pedicels 2.5 in long, hispid Calyx persistent, cup-shaped, with 5 lanceolate, acuminate, hairy lobes Corolla white, 5 in long, tube dilated upwards, hairy outside lobes short, obtuse, rounded Stamens shorter than the tube, abortive ones very much reduced Pistil hairy Berry 2.5 in long, oblong, ellipsoid, hairy Miq Fl Ind Bat II 742, Clarke in DC Monog Phan V 1 203, t 23, and in Hook f Fl Br Ind IV 375, Ridley in Journ Str Br R As Soc No 43, 88 *C frutescens*, Wall Cat 807 partly, not of Jack

PENANG Government Hill, Curtis 1204, Wallich 807, (part),

**Maingay** (K D) 1232 PERAK Bujong Malacca, *Ridley* 9703, Larut Hills, *Ridley* and *Fox*, *Scortechini* 367, 1231, *Wray* 2196, *King's Collector* 2052, 5131, 3891 — DISTRICT Sumatra

2 **CYRTANDRA SUFFRUTICOSA**, *Ridley* in Trans Linn Soc Ser. 2, III 330 (1893) A large shrub, 4 ft tall, with hollow 4-angled pale stems 25 in thick *Leaves* opposite, one of each pair often very much smaller alternately on one side or the other, lanceolate, abruptly acuminate, subfalcate, inequilateral, edges entire nerves conspicuous, about 12 pairs, glabrous when adult, young leaves and petioles red-pubescent, 7 to 9 in long, 2.5 to 3 in wide petiole 5 to 7.5 in long *Peduncles* short and thick, axillary bracts free, ovate acute, pubescent 1 in long, 5 in across, flowers about 6 in a head nearly sessile *Calyx* deciduous, sepals linear *Corolla* glabrous, over 1 in long, base cylindrical, dilated upwards, lobes rounded, obtuse, white with brown streaks in the throat *Anthers* large, elliptic *Style* pubescent *Berry* 7.5 in long, sausage shaped *Ridley* in Journ Str Br R As Soc No 43 89

PERAK *Scortechini* 142, Gopeng, *King's Collector* 4720 Kota Bahru, *King's Collector* 569 Tupu Larut, *Wray* 2845 JOHORE Tenggara, *Bulding* Pulau Tioman *Ridley* On rocks

*Ridley* says it is nearly allied to a Bornean species, *C. oblongifolia*, *Clarke* but much larger in all parts It is generally found growing on rocks or (*King's Collector* 4720) from the top of a high tree *Wray* describes the flowers as white marked in the throat with dark claret bracts green without claret within, fruit light green finely spotted pale

3 **CYRTANDRA FALCATA**, *Ridley* in Journ Str Br R As Soc No 43, 89 (1905) Epiphytic shrub, about 2 ft tall, stem quadrangular, fistulose, pale *Leaves* lanceolate acuminate, falcate, alternate, often with small opposite ones, glabrous when adult, narrowed at the base into the petiole, nerves about 10 pairs, 7 or 8 in long, 1.5 in wide, petiole 1 in long, pubescent *Cymes* axillary, 125 in shortly-peduncled bracts broadly ovate, acute, pubescent, 5 in long, flowers few, shortly pedicelled *Fruit* fusiform, 5 in long

PERAK *Wray* 2845, *Scortechini* 142 SINGAPORE woods round the Kuala Lumpur Caves, *Ridley* 8219

Allied to *C. oblongifolia*, *Hook f.*, and *C. suffruticosa*, *Ridley* but the leaves are much narrower than those of the latter, and thinner and with more conspicuous nerves than those of the former

4 **CYRTANDRA PILOSA**, *Blume* Bijdr 770 (1826) Shrub with stout 4-angled hollow stems as much as 5 in through, 3 ft tall, upper parts pubescent *Leaves* opposite, obovate, narrowed into a winged petiole margins serrate, above more or less covered with pale hairs from a

swollen base, in old leaves often glabrescent, beneath covered with red hairs on the nerves, nerves prominent 10 to 12 pairs, 8 to 18 in long, 3 to 4 in wide. *Cymes* small, nearly sessile, axillary, bracts ovate or lanceolate acuminate, hairy, 1 in long. *Calyx* tubular, hairy, 5 in long, bifid. *Corolla* white, 1 in long, silky-hairy, tube infundibuliform, stout, upper lobes oblong obtuse, lower two connate, shortly bifid, obtuse, punctate above. *Stamens* little longer than the tube, filaments glabrous, abortive stamens short. *Fruit* ovoid, conic, acute, brown, reticulate tessellate, 5 to 75 in long. G. Don Gen Syst IV 661, DC Prodr IX 282. Miq Fl Ind Bat II 742, Zoll Verh Ind Archip 55, Clarke in DC Monog Phan V 1 231, and in Hook f Fl Br Ind IV 375. Ridley in Journ Str Br R As Soc No 43, 90. *C. decurrens*, De Vriese Pl Ind Bat Reinwtd 14, Miq l c 746, Clarke Ucc 231, 375.

PENANG Penara Bukit, Wallach 807, on banks in forests. PRAK Larut Hills, Ridley 2915, Curtis 2897, Scortechini 354, 270, King's Collector 5588. SFLANGOR Bukit Kutu, Ridley 7574, Bukit Hitam, Pahang Track, 8560, 8554. NIGRI SEMBILAN Bukit Tanga, Napier, Bukit Sulu, Cantley. JOHORE Gunong Pantu, Ridley, Bukit Tanah Abang, Kelsall.—DISTRIB Tenasserim to New Guinea. In rocky woods up to about 2000 ft altitude.

Ridley says he is unable to separate specifically the forms described respectively under the names of *C. pilosa*, Bl., and *C. decurrens* De Vr. at least as far as applies to the variety *Wallachi* of the latter. The main distinction seems to be in the amount of hairiness of the leaves, in which point the plant seems very variable.

5 *CYRTANDRA LANCEOLATA*, Ridley in Journ Linn Soc XXXII 527 (1895). *Stem* about 1 ft tall, quadrangular, upper part pubescent, the base bare. *Leaves* oblanceolate acute, narrowed at the base, crenulate, almost entirely glabrous, 12 in long, 4 in wide. *Cymes* at the base of the stem below the leaves very shortly peduncled, lax, many-flowered. *Pedicels* 75 in long, hispid. *Bracts* lanceolate, small, hispid. *Calyx* 15 in long, tubular, hispid, lobes 3, linear acuminate. *Corolla* 15 in long, dilated above, pubescent, white, throat yellow. *Anthers* long, narrowed above. *Style* 1 in long, pubescent, stigma bilobed, lobes oblong, linear. Ridley in Journ Str Br R As Soc No 43, 91.

JOHORE Gunong Pantu, Ridley.

6 *CYRTANDRA PENDULA*, Blume Bijdr 768 (1826). *Stem* 1 or 2 ft tall. *Leaves* alternate, ovate cordate or lanceolate, entire or crenate, dark green and glabrous above, often barred with white and covered with reddish tomentum beneath, 8 in long, 4 to 6 in wide, petiole 3 to 6 in long, opposite leaf in each internode reduced to a subulate process.

*Capitulum* of 20 flowers on peduncles 4 in long, decurved, appressed hairy, bracts lanceolate, acuminate, hairy, flowers shortly pedicelled *Calyx* tube 5 in long, thin, shortly bifid *Corolla*-tube 15 in long, base narrow, curved, ventricose upwards, cream-coloured or pale yellow, hairy, upper lip of two rounded lobes lower of three broader oblong rounded ones, all creamy white or pale yellow with purple spots in the mouth and tube *Stamens* 2, glabrous filaments purplish, sinuate anthers oblong, connivent *Style* stout, white, stigma transversely oblong *Fruit* sausage shaped, 5 in long G Don Gen Syst Dichl Pl IV 660, DC Prodr IX 281, Miq Fl Ind Bat II 739 Hook Ic Pl t 736 Clarke in DC Monog Phan V 1 242 Ridley in Journ Str Br R As Soc No 43 91 *C. bicolor*, Jack in Trans Linn Soc XIV 27 DC lc, Clarke in Hook f Fl Br Ind IV 375 Miq lc

PERAK Laut Hills, *Curtis* 2036, *Scortechini* 142 and 254 Wray 2845 Ulu Beia, *King's Collector* 10810 SELANGOR Kuala Lumpur, Bukit Hitam, *Ridley* SUNGAI UJONG Bukit Sulu *Cantley* MALACCA *Mainray* PAHANG Kuala Tembeling, *Ridley* JOHORE Gunong Panti, Pulau Tuman SINGAPORE Bukit Timah, *Ridley* 2703 *King* — DISTRIB Java and Sumatra

7 *CYRTANDRA CUPULATA* *Ridley* in Journ Linn Soc LXXXII 527 (1895) A shrubby plant 2 or 3 ft tall, stem terete or more or less 4 angled above covered with red hair *Leaves* opposite, equal, very variable oblanceolate with an acuminate base, serrately toothed, scantily hairy above, more hairy beneath, petiole sometimes winged to the base, villous 1 in long blade 12 in long, 4 in wide *Peduncle* 5 in long, axillary in pairs villous bracts connate in a white hairy cup 1 in long bracteoles short lanceolate, acute, white flowers numerous, opening singly, little longer than the bract *Corolla* 1 in long, curved, infundibuliform, 2-lipped, pubescent, white, yellow and brown in the mouth, lobes 5 subequal, ovate, obtuse *Stamens* included, 2 *Pistil* short ovary oblong with a terminal tuft of hair, style short, curved, stigma clavate, bilobed *Fruit* 5 in long, fusiform *Ridley* in Journ Str Br R As Soc No 43, 92

PERAK Tapa, *Wray* 1389 and 191, Ulu Bubong, *King's Collector* 10250, Larut Hills, *Scortechini* 366 Chanderiang, *King's Collector* 5833, in wet woods MALACCA lower slopes of Mount Ophir, *Ridley* 7575, Sungai Buluh, *Ridley* 10550 PAHANG Tahan Woods, *Ridley* 2150

## Family XC — VERBENACEÆ

Herbs, shrubs or trees. *Leaves* opposite or verticillate (apparently alternate in *Leunisia*), simple, digitate or pinnate (*Peronema*), stipules none. *Inflorescence* cymose, racemose or spicate, often in panicles, bracts usually small, sometimes leafy, flowers hermaphrodite or sometimes polygamous, generally irregular, often brightly coloured, sometimes with coloured calyx or enlarged coloured involucre. *Calyx* inferior, gamosepalous, 5- to 4 (rarely 6- to 8) lobed, often accrescent. *Corolla* gamopetalous, tube usually cylindric or dilated above, often curved, limb 2-lipped or subequally lobed, lobes 4 or 5, rarely more. *Stamens* usually 4 didynamous, sometimes 2, sometimes 5, 6 or more, inserted on the corolla-tube, filaments free, anthers 2-celled, opening longitudinally. *Ovary* superior, sessile, 2 to 4 celled, entire or 4-lobed, ovules variously attached, 2 (sometimes 1) in each cell, style terminal, stigma entire or bifid at apex. *Fruit* drupaceous with bony pyrenes, or capsular, 1 to 4-celled, mesocarp usually fleshy, endocarp usually bony. *Seeds* erect or pendulous, separate in distinct cells, albumen usually none, embryo straight, radicle inferior. **DISTRIB.** Tropical regions of both hemispheres, very few extending to temperate countries, species about 750.

Inflorescence spicate centripetal (the lowest flowers opening first) (Tribe I VERBENACEÆ)

Shrubs or herbs with short spikes, calyx minute, stamens 4, anther cells parallel —

Fruit a drupe with fleshy mesocarp . 1 LANTANA

Fruit dry with thin granular mesocarp 2 LITSEA

Herbs with long spikes, calyx long, tubular, stamens 2, anther cells divaricate

3 STACHYTARPHILA

Inflorescence cymose, centrifugal (the end flowers opening first) —

Cymes paniculate, drupes fleshy (Tribe II VITICACEÆ) —

Leaves simple —

Corolla regular, stamens isomerous, equal —

Flowers 5 merous, drupe with 5 to 10 pyrenes

4 GEUNISIA

Flowers 4 merous, drupe with 4 pyrenes .

5 CALLICARIA

Flowers 4 to 6 merous, drupe with 14 celled endocarp included in the accrescent calyx

6 TECTONIA

Corolla 2-lipped, stamens didynamous —

Drupe with 1 pyrene —

Flowers small

7 PERONEMA

Flowers large

8 CAMELINA

Drupe with 4 pyrenes (1 to 3 often suppressed)

9 CLERODENDRON

Leaves digitate or in 1 species unifoliate, pyrene 1

10 VITEX

*Cymes* paniculate, drupes capsular (Tribe III CARYOPHYTES) —

Leaves imparipinnate, fruit 4 celled, calyx not enlarged in fruit, trees

11 PERONOMA

Leaves 1 to 3 foliolate, fruit 2 celled, calyx much enlarged in fruit, climbers

12 PETRAEOVITEX

*Cymes* capitate bracts of the flower head usually large and involucriform, large climbers (Tribe IV SYMPHORIEACEAE) —

Involucral bracts 6, corolla lobes subequal, stamens included or exsert

.. 13 SPHENODERMIS

Involucral bracts 4, corolla 2 lipped the two lobes of the upper lip the longest stamens exsert

.. 14 CONGEEA

*Cymes* densely capitate or in short spikes, centripetal, flowers small, calyx segments 5, much imbricate, trees or shrubs (Tribe V AVICENNACEAE)

15 AVICENNIA

*HOEMODIODIA SANGUINALIS*, Retz Obs VI 31 (1791) is a staggling shrub of the Eastern subtropical Himalaya with a large red obconic calyx and red flowers often cultivated in gardens and occasionally found as an escape

PENANG on Government Hill, ( Curtis 2879

*DURANTA PRURIENS* Jacq Select Stirp Amer 186 t 176 fig 76 (1763) is a blue flowered shrub cultivated in gardens and sometimes found run wild in their neighbourhood

SINGAPORE Ridley

## Tribe I VERBENACEAE

### 1 LANTANA, Linn

Erect or subscandent, often rambling, pubescent or scabrous shrubs, rarely herbs, branches usually tetragonal sometimes prickly *Leaves* simple, opposite or ternate, petiolate incise crenate, more or less rugose *Flowers* in dense pedunculate spikes from the axils of the leaves, variable in colour, the spikes capitate, ovoid or cylindric, bracts conspicuous, persistent ovate or lanceolate bracteoles none *Calyx* small, membranous, campanulate, truncate or 4 to 5 toothed *Corolla* hypocrateriform tube slender, cylindric lobes 4 to 5, spreading, orbicular *Stamens* 4 didynamous, included in the corolla tube and inserted at its middle anthers broadly oblong with parallel cells *Ovary* 2 celled, ovule solitary in each cell, erect from the base or laterally attached close to the base, style short stigma oblique or sublateral, thickened *Fruit* a drupe with more or less fleshy mesocarp, endocarp hard, separating when ripe into two 1 celled, 1 seeded pyrenes *Seed* exalbuminous, testa reticulate, radicle inferior — **DISTRIB** Species about 50, tropical or subtropical, mostly American, a few African or Asiatic



Bracts lanceolate; without prickles	..	.. 1. <i>L. salvifolia</i> .
Bracts ovate, acuminate; with recurved prickles	..	.. 2. <i>L. aculeata</i> .

1 *LANTANA SALVIFOLIA*, Jacq Hort Schoenbr III 18, t 285 (1798) An erect branching shrub, reaching 3 to 8 ft in height, stems rough, without prickles, branchlets quadrangular, strigosely hispid, yellowish-brown. *Leaves* opposite or in whorls of 3, membranous when dry, ovate-lanceolate, acute at apex, suddenly narrowed and then decurrent at base, both surfaces rugose, the upper strigosely hispid, the lower villous and pale, margins crenate-serrate, 2 to 5 in long, 1 to 2 in broad, main nerves 8 to 12 pairs, the lowest pair opposite and more oblique than the others, all curving to the margin, reticulations prominent, petiole 2 to 4 in long, winged by the decurrent margins of the blade. *Spikes* globose to oblong, 5 to 1 and even 15 in long, gradually elongating as the fruit ripens, peduncles angular, hispid, 1 to 3 in long, bracts ovate, caudate-acuminate, strigosely villous, 25 in long. *Calyx* minute, truncate, densely villous. *Corolla* tube curved, slightly inflated opposite the stamens, villous without, 2 in long, lobes spreading, rounded, the uppermost slightly acute. *Filaments* short, anther-cells equal. *Drupe* oblong, purple, exocarp thin, hispid, mesocarp fleshy, endocarp rugose, the 2 pyriform pyrenes of which it is composed closely adherent. *Seed* elliptic, testa reticulate, cotyledons thin. Baker in Dyer Fl Trop Afr V 276, Schauer in DC Prodr XI 605. *L. indica*, Roxb Hort Beng 46 (1814), and Fl Ind III 89, Wall Cat 1823 A,B, Wight Ill t 173 b, fig 3, and Ic t 1464, Trimen Fl Ceyl III 346, Clarke in Hook f Fl Br Ind IV 562, Cooke Fl Bomb II 418, Prain Beng Plants 825. *L. dubia*, Wall Cat 1821, 2 and c, not 1, Royle Ill 300 t 73, fig 2. *L. collina*, Dene in Jacquem Voy Bot 136, t 141. *L. alba*, Schauer l c 606, Dalz & Gibs Bomb Fl 198, Brandis For Fl 369. Kurz For Fl II 253, Boiss Fl Orient IV 532, not of Miller, Dene or Link.

PENANG *Ridley*, *Curtis* 121, *Deschamps*. PERAK at Teluk Anson, *Ridley* 10762. MALACCA *Ridley* 10115. SINGAPORE *Deschamps*, *Kunstler* 135.—DISTRIB India, Burma, Ceylon, Tropical and South Africa.

2 *LANTANA ACULEATA*, Linn Sp Pl 627 (1753) A very straggling erect shrub with many branches, 4 to 8 ft high, branchlets quadrangular, armed with recurved prickles. *Leaves* opposite, ovate, acute at apex, truncate or cordate at base, the blade decurrent, upper surface scabrous, lower pubescent, margins crenate, 1 to 3 in long, 1 to 2 in broad, midrib slender, main nerves 5 to 6 pairs, curving upwards to the margin, reticulations netted, petiole slender, 5 to 7 in long, the upper part bordered by the decurrent margins of the blade. *Spikes*

globose, 25 to 1 in in diam, peduncles 1 to 1.5 in long, hispid, bracts lanceolate, 25 in long, flowers of various colours, orange, red, and white. *Calyx* very small, slightly 2 lipped, pubescent. *Corolla*-tube slender, pubescent, 2 to 4 in long, lobes rounded, spreading. *Filaments* very short, anther-cells unequal. *Drupe* ovoid, black, shining, 1 to 2 in in diam, pyrenes rounded. Bot Mag t 96, Dalz & Gibbs Suppl 68 Trimen Fl Ceyl III 346. *L. Camara*, Linn l c. Schauer in DC Prodr XI 598, Hook f Fl Br Ind IV 562. Cooke Bomb Fl II 419, Prun Reng Plants 825, Baker in Dyer Fl Trop Afr V 275.

PLNANG *Curtis*, *Deschamps*. PROVINCE WELLESLEY & KING SINGAPORE. *Deschamps* — DISTRIB Native of Tropical America, now widely spread in many regions of the Old World and very troublesome from its quick and strong matted growth.

## 2 LIPPIA, Linn

Shrubs or undershrubs, rarely herbs, usually more or less hairy. *Leaves* opposite ternate or verticillate, rarely alternate, entire dentate or lobate. *Flowers* small, in elongate or cylindrical or capitulate spikes. bracts small, imbricate, bracteoles none. *Calyx* small, membranous 2 to 4 lobed, ultimately 2 valved, enclosing or some times adhering to the fruit. *Corolla* more or less hypocrateriform tube cylindrical, straight or curved. limb oblique more or less bilabiate, upper lip bifid, emarginate or 2-lobed, lower lip 3 lobed. *Stamens* 4 didynamous, included in the corolla tube and inserted at its middle, anthers ovate with parallel cells. *Ovary* 2 celled, ovule solitary in each cell, erect from the base or laterally attached near the base of the cell, style short stigma capitate oblique or recurved, thickened. *Fruit* small, with a dry epicarp, mesocarp granular endocarp hard, bony, easily separating into two 1 seeded pyrenes. *Sad* exalbuminous, radicle inferior — DISTRIB About 100 or more species, chiefly Tropical American, with a few African and only very few Asiatic.

LIPPIA NODULORA, Michx Fl Bor Amer II 15 (1803). A creeping perennial herb, stems rooting at the nodes, much branched, sub quadrangular, channelled, more or less clothed with appressed, medifixed, white hairs, often glabrous. *Leaves* opposite, subsessile, spatulate, rounded at apex, cuneate at base, both surfaces appressedly hairy with medifixed white hairs, upper half deeply and sharply serrate, lower entire, .75 to 1.25 in long, .25 to .75 in broad, midrib prominent, main nerves 3 to 4 pairs, straight. *Spikes* dense, globose at first, afterwards gradually elongating to oblong in fruit, .25 to .5 in long, peduncles 1 to 3 in long, usually from only one axil of each pair

of leaves, slender, quadrangular, channelled, bracts much imbricate, variable, 1 to 2 in long, lower broadly ovate, upper narrowly cuneate, all acuminate with more or less hyaline fimbriate margins, flowers small, pale blue, pink, or white. *Calyx* 2-lobed, lobes lanceolate, pubescent. *Corolla*-tube slender, 1 in long, limb 2-lipped, lower lip 3-lobed, midlobe obtuse. *Stigma* capitate. *Fruit* 0.5 to 0.75 in long, glabrous, ovoid, epicarp bony, membranous, mesocarp granular, endocarp separating in two plano convex pyrenes. *Seed* elliptic, testa membranous, cotyledons fleshy. Schauer in DC Prodr XI 585, Wight Ill t 173 b, fig 2, and Ic t 1463, Dalz & Gibs Bomb Fl 198, Clarke in Hook f Fl Br Ind IV 563, Miq Fl Ind Bat II 905, Trimen Fl Ceyl III 347, Cooke Bomb Fl II 420, Prain Beng Plants 825. Baker in Dyer Fl Trop Afr V 279. *Verbena nodiflora*, Linn Sp Pl 20, Burm Fl Ind 12, t 6, fig 1, Roxb Hort Beng 4. *Blattia nodiflora*, Gaertn Fruct I 266, t 56. *Zapana nodiflora*, Lamk Ill t 17. Wall Cat 1824. *Latana sarmentosa* and *repens*, Spreng Syst II 752. *Phyla chinensis*, Lour Fl Cochinch 66.

PINANG at Sango Penang, *Curtis* 3520. PROVINCE WELLESLEY *Curtis* 2208. SINGAPORE *Kunstler* 1198, in grassy and sandy places near the coast.—DISTRIB India, Malay Archipelago, Africa and most tropical and subtropical regions.

### 3 STACHYTARPHETEA, Vahl

Herbs or shrubs. *Leaves* usually opposite, toothed, usually rugose. *Flowers* in terminal spikes in the axils of bracts, the rachis often hollowed out beneath each flower, bracts lanceolate, long or short, bracteoles none. *Calyx* elongate, narrowly cylindrical, shortly 4 to 5 toothed, variously slit at a late stage. *Corolla* hypocrateriform, tube slender, cylindrical, usually curved, limb spreading, 5-lobed, the lobes equal or unequal, rounded. *Stamens* 2 perfect (the antecous ones), included in the corolla tube, affixed above the middle filaments, short, anther cells vertically divaricate, staminodes (posticous) 2 or 0. *Ovary* 2-celled, ovules solitary in each cell, attached laterally near its base, style long, filiform, exserted, stigma capitate. *Fruit* cylindrical, included in the calyx, separating into 2 bony 1-seeded pyrenes. *Seed* oblong, testa membranous, albumen none, cotyledons fleshy, radicle inferior.—DISTRIB About 40 species, mostly Tropical American, a few African, the Indo-Malayan species probably introduced and run wild.

Spikes usually slender, glabrous, flowers blue

1 *S. jamaicensis*

Spikes usually stout, hairy, flowers pink

2 *S. mutabilis*

1 STACHYTARPHETA JAMAICENSIS, Vahl Enum I 206 (1805) An

annual erect branched herb reaching 1 to 3 ft high stems dichotomously branched nearly quadrangular *Leaves* opposite elliptic obtuse or acute at apex cuneate at base and decurrent upper two thirds coarsely serrate lower cuneate portion entire both surfaces glabrous or nearly so 1 to 4 in long 1 to 15 in broad midrib slender main nerves slender 4 to 6 pairs curved upwards petiole obscure being winged by the decurrent margins of the blade *Spikes* elongate 3 to 12 in long slender rachis up to 15 in in diam conspicuously excavated to hold the flowers the hollows closed by the bracts bracts lanceolate acuminate scarious and ciliate on the margins 15 to 2 in long flowers blue *Calyx* 25 in long membranous glabrous 4 to 5 toothed usually slit on one side (that in the hollow of the rachis) *Corolla* tube curved outwards 3 to 5 in long limb spreading 5 lobed *Fruit* dry 15 in long tipped with the slender remain of the style pyrenes plano convex very hard Bot Mag t 1860 *S. indica* Vahl l c Clarke in Hook f Fl Br Ind IV 564 Trimen Fl Coyl III 348 Cooke Bomb Fl II 421 Poir Beng Plants 826 Baker in Dyer Fl Trop Afr V 284 *S. urticifolia* Dul A Gibs Bomb Fl Suppl 68 *Stachytarpheta jamaicensis* Schauer in DC Prodr XI 564 *S. indica* Schauer in DC l c Mag II Ind Bat II 907 *Verbena jamaicensis* Linn Sp Pl 19 Roxb Hort Beng 4 *V. indica* Linn Sp Pl ed 3 27 Willd Cat 2656

PI NANG common by roadsides *Gr King* on Government Hill (Curtis) PERAK at Panyore *Scottichini* 996 JOHORE *Marius Jensen* SINGAPORE *Cunning* 2406 in waste place *Dischamps Kunster (Kings Collect)* 173 1149 DISTRIB India Ceylon Malay Archipelago Tropical Asia and Africa in Malaya probably introduced and run wild

2 *STACHYTARPHETA MUTABILIS* Vahl Enum I 209 (1805) A stout branching pubescent herb reaching 3 ft high or more stems quadrangular densely tomentose pubescent *Leaves* opposite ovate acute at apex rounded at base and decurrent upper three fourths broadly crenate the crenatures mucronate basal part entire upper surface sparsely villous and scabrid lower softly grey tomentose 3 to 5 in long 15 to 25 in broad midrib stout main nerves 6 to 8 pairs petiole 15 to 1 in long almost entirely bordered by the decurrent margins of the blade *Spikes* stout elongate 6 to 18 in long rachis up to 25 in in diam excavated vertically to hold the flowers the hollows closed by the bracts bracts ovate lanceolate, cuspidate acuminate strigosely hairy 25 to 5 in long flowers pink *Calyx* 4 to 5 in long strigosely pubescent 4 toothed on the outer side cleft on the inner the teeth acute *Corolla* tube curved outwards up to 1 in long slightly

dilated at the throat, limb spreading, lobes 5 rounded *Anther*-cells 05 in long, filaments villous, staminodes subulate, villous, 15 to 2 in long *Fruit* oblong, ovoid or somewhat pyriform, tipped with the long remains of the style, pyrenes plano-convex, very hard, 2 to 25 in long *Seed* oblong, 15 in long, testa membranous, cotyledons obovate, 1 in long, fleshy Schauer in DC Prodr XI 565, Bot Mag t 976, Cooke Bomb Fl II 422, Baker in Dyer Fl Trop Afr V 284 *Verbena mutabilis*, Jacq Coll 2, 334, Icon Rar 2, 207, Andr Bot Rep t 435

PENANG *Curtis* 867, *Birch*, *Ridley* 7044 SINGAPORE in waste places, *Deschamps* DISTRIB A native of Tropical America, widely spread in the Old World, *e g*, Southern India, Java, Central Africa

## Tribe II VITICÆ

### 4 GEUNZIA, Blume

Trees or large shrubs, stellately tomentose *Leaves* opposite or occasionally alternate by the separation of the leaves of a pair, petiolate, entire *Flowers* small, in many flowered pedunculate cymes in the upper axils of the branchlets, bracts linear, small *Calyx* campanulate, shortly 5- to 6 toothed *Corolla* campanulate, tube exsert, funnel shaped lobes 5, spreading *Stamens* 5 to 6, anthers oblong, exserted, glandular, dorsifixed, cells parallel, dehiscing longitudinally but more widely at tip, filaments slender *Ovary* imperfectly 5-, rarely 4 to 3 celled the cells 2 ovulate the ovules fixed laterally above the middle of the cell style exsert, stout, stigma 5- or less lobed, dilated *Drupe* small globose, depressed on the persistent not enlarged calyx, exocarp thin, mesocarp granular, endocarp hard pyrenes 5 to 10, equal in number to the ovules, 1 seeded *Seeds* small, oblong ovoid, testa thin albumen none cotyledons fleshy radicle inferior —DISTRIB 3 to 4 species, of the Malay Peninsula and Archipelago

GEUNZIA FARINOSA, Blume Bijdr 819 (1826) A large tree, reaching 60 to 70 ft in height and a considerable diameter, the upper branches, inflorescence, and under surface (also upper surface when young) of leaves covered more or less densely with stellate furfuraceous pale brown tomentum, and also often with minute rounded glands *Leaves* coriaceous, ovate or elliptic-oblong, long cuspidate acuminate at apex, rounded or subacute at base, upper surface when young farinose, later glabrous, lower surface rugose, margin entire or minutely denticulate, 5 to 9 in long, 2 to 4 in broad, midrib prominent, main nerves 10 to

12 pairs obliquely curved upwards and joined by many more or less parallel transverse nerves, reticulations close, petiole stout, 1 in long, channelled above, the opposite ones joined by a raised line. *Cymes* rounded, dichotomously branched, 1.5 to 2 in broad, peduncles 1 to 1.5 in long, bracts subulate, 1.5 to 2 in long, pedicels very short, flowers reddish-purple. *Calyx* 0.6 in deep, glabrous within. *Corolla*-tube 1 to 2 in long, glandular, lobes recurved, 0.5 in long, rounded. *Stamens* exserted, filaments a little longer than the corolla tube, anthers 1 in long, very glandular on the back. *Drupa* reddish black when ripe, 1.5 in broad, 1 in in diam, top depressed. Clarke in Hook f Fl Br Ind IV 566, Boequillon Revis Verben 89, t 8, Koord & Valetton Bijdr VII 173. *C. cumingiana*, Rolfe in Journ Linn Soc XXI 315. *Callicarpa pentandra*, Roxb Fl Ind I 395, Wall Cat 1836, Schauer in DC Prodr XI 646 Miq Fl Ind Bat II 885. *C. acuminatissima*, Teyss & Binn in Batav Nat Tijdschr XXV 409. *C. cumingiana*, Schauer, l c 644.

KEDAH on Langkawi Island, *Curtis* 2552. PERAK *King's Collector* 859, 972 (part), 5731, 8547. SELANGOR at Batu Tiga *Curtis* 3767, at Ginting Bidai, *Ridley* 7599, at Rawang, *Ridley* 10494. SINGAPORE *Halluc* 1836. DISTRIB Java (*Forbes* 315, 375 539, 602 *Kollman*, *Koorde*s 15204b), Borneo (*Beccari* 786 *Haviland* 554, 1343, 3553, *Motley* 385) Amboina, Philippine Islands, &c.

The following Borneo species seems to be undescribed —

GLANDIA HAVITANI II *King & Gamble* in Kew Bull 105 (1908). A tree (?), branches inflorescence, and under surface of leaves densely tomentose; lvs pubescent and strigosely hairy. *Leaves* opposite ovate or ovate-oblong shortly acuminate and mucronate at apex acute or cuneate at base, upper surface strigosely scabrous hispid on the upper surface especially on the midrib, lower surface rugose, stellate pubescent and studded with peltate glands, margins rather distinctly denticulate, 2.5 to 6 in long 1 to 2.5 in broad, midrib stout prominent main nerves 9 to 11 pairs, prominent beneath, gently curving upwards to anastomose near the margin joined by conspicuous transverse nervelets, reticulations netted, petiole stout tomentose hispid, 1 to 7 in long. *Cymes* axillary, few flowered, subsessile, scarcely longer than the petiole, bracts very small, subulate, pedicels slender, short. *Calyx* campanulate, glabrous within, without very strigosely hispid, teeth 5, minute in bud afterwards elongating to 0.5 in long. *Corolla* campanulate, nearly glabrous except for peltate shining glands, tube 1 in long, lobes 5, ovate, rounded, about 0.75 in long, recurved in flower. *Stamens* exserted, filaments slender glabrous, anthers 1 in long, oblong, prominently yellow glandular on the back. *Ovary* thickly glandular, depressed, style slender, 2 in long, stigma shortly 5 lobed. *Drupa* reddish black when dry, 1.5 in in diam, top depressed, dividing into 5 pyrenes, fruiting calyx flattened.

BORNEO at Sarawak, *Beccari* 4240, *Haviland* 3549 k and l near Kuching *Haviland* 889.

We are a little in doubt whether this is the *G. Beccariana*, Briquet in Engl. & Prantl Nat. Pflanzenfam. IV. 3 and 165, of which we can find no description. We think, however, that Briquet's *G. Beccariana* is Beccari 2759, a beautiful species from Sarawak with long tawny hair.

### 5 CALLICARPA, Linn.

Trees or shrubs, more or less clothed with stellate or farinose tomentum, with or without glandular scales, rarely quite glabrous. *Leaves* opposite, rarely ternately whorled, crenulate serrulate or rarely entire, in one species lobed. *Flowers* small, white red or purple, in axillary sessile or pedunculate, usually many-flowered, cymes, bracts linear, inconspicuous. *Calyx* very small, shortly campanulate, truncate or minutely 4-lobed, unaltered in fruit. *Corolla* small, campanulate or tubular, tube twice as long as the calyx or less, lobes 4, oblong, erect or spreading. *Stamens* 4 equal, inserted at about the middle of the tube or lower, sometimes at the base, filaments slender, exsert, anthers ovate or oblong, dorsifixed, the cells parallel, both sides usually prominently glandular. *Ovary* imperfectly 2-celled, cells 2-ovuled, style elongate, stigma dilated, shortly and obscurely bifid, ovules attached at the middle of the cell or higher. *Fruit* a small globose drupe, supported by the persistent calyx, exocarp thin, mesocarp fleshy, endocarp bony, of 4 or fewer pyrenes, convex on the back, flattened on the sides. *Seeds* small, oblong, testa membranous, albumen none or evanescent, cotyledons fleshy, radicle inferior.—*DISTRIB.* About 30 species, of Tropical and Subtropical Asia, to Japan, Australia and Polynesia, also in Central America and the West Indies

Lower surface of leaves covered with dense stellate tomentum, without or with very few glandular dots, margins of leaves entire or nearly so —

Leaves broad, more or less elliptic; cymes long, many-flowered —

Leaves long acuminate, tomentum thick, cymes dense; corolla-tube only about .075 in long, merely puberulous 1 *C. arborea*.

Leaves obtuse or very shortly acuminate, tomentum thin, cymes spreading; corolla tube 1 in. long, stellate-pubescent 2 *C. Mangayi*.

Leaves narrow, lanceolate, cymes short, few-flowered, corolla-tube 15 in. long, stellate-pubescent . 3 *C. angustifolia*

Lower surface of leaves densely grey stellate-flocculose, with many glandular dots on both surfaces; margins of leaves serrate —

Cymes spreading, reaching 3 to 4 in in diam, upper surface of leaves glabrate, lower densely grey-flocculose . . 4. *C. Reevesii*

Cymes dense, rounded, rarely 1 to 2 in in diam.—

Upper surface of leaves glabrate, lower whitish-grey, stellately tomentose

5 *C. cana*

Upper surface of leaves hispid puberulous, lower thinly grey stellate tomentose .. .. .	6. <i>C. pedunculata</i>
Lower surface of leaves sparsely stellate hairy, with many glandular dots, margins of leaves serrulate, cymes rounded, up to 2 in broad .. .. .	7. <i>C. longifolia</i>

1 *CALLICARPA ARBOREA*, Roxb Hort Beng 10 (1814), and Fl Ind I 390 (1832) A tree reaching 40 ft in height, with thick trunk and round head branches stout branchlets thick, obtusely quadrangular, covered with dense grey-tawny, forked, stellate or mealy tomentum, as are the young leaves and inflorescence *Leaves* coriaceous, ovate or elliptic-ovate, acuminate at apex, long acute or cuneate at base upper surface when young with mealy soft stellate-tomentum, afterwards glabrous, lower closely tawny stellate tomentose, margins entire or sometimes distally denticulate, 6 to 12 in long, 2 to 5 in broad, midrib very stout much raised beneath main nerves stout, 8 to 14 pairs, raised beneath and joined by fairly regular transverse raised nervules, the main nerves starting at an angle of about 55° with the midrib and curving gently to the margin, where they anastomose petiole stout, 1 to 2.5 in long, channelled above *Cymes* very many flowered, widely dichotomously branched many times, reaching 6 in in length and about 5 in in breadth, peduncles 1 to 3 in long, bracts linear subulate, 2.5 in long or less pedicels very short, flowers red or purple *Calyx* 0.5 in long truncate and minutely 4 toothed at mouth glabrous within *Corolla* tube 0.75 in long, puberulous without lobes 4, reflexed, subquadrate as long as tube, villous without *Stamens* long, exsert, anthers glandular punctate on the back *Ovary* villous, style much exsert, bent outwards, enlarged upwards, stigma peltate at first, then broadly funnel-shaped *Drupe* 1.5 to 2 in in diam, succulent, purple, ultimately black, pyrenes 4 or less Wall Cat 1826 chiefly Schauer in DC Prodr XI 641, Brandis For Fl 368, Kurz For Fl II 274, Clarke in Hook f Fl Br Ind IV 567, Plain Beng Plants 827 *C. tectonifolia*, Wall Cat 1827

KEDAH at Campong Yan, Ridley 5607 PENANG Tanjong Bunga, Curtis 699, Batu Gaja jungles, Deschamps PILAK Wray 1824, 3957, at Buas Dindings, Ridley 7179, Scortechini, King's Collector 972 (part) — DISTRIB India (Kumaon to Assam, Sonthal Parganas Chota Nagpore, Eastern Bengal), Burma, Sumatra (Teysmann 4388, Forbes 1530, 2601)

VAR *villosa*, Roxb Hort Beng 10 (species) *Leaves* 6 to 8 in long, 3.5 to 4.5 in. broad, ovate, caudate-acuminate at apex, rounded and then slightly decurrent at base Tomentum of branchlets, young leaves, and inflorescence very thick and pale, chiefly consisting of



branched hairs This var resembles *C lanata*, Linn, of Southern India and Ceylon in its leaves, but the flowers are those of *C. arborea*

PERAK *Scortechini*

2 *CALLICARPA* MAINGAYI, King & Gamble in Kew Bull 106 (1908)  
A tree, young branches, inflorescence, and leaves beneath covered with minute golden-brown stellate tomentum, branchlets stout, obtusely quadrangular. Leaves coriaceous, elliptic or obovate, rounded and very shortly acute or acuminate at apex, rounded and then somewhat cuneate at base, the two sides often unequal, upper surface glabrous except the midrib and main nerves of young leaves, lower surface rugose and very minutely appressed stellate-pubescent, margins entire or undulate with minute denticulations at the ends of the nerves, 6 to 12 in long, 3 to 6 in broad, nerves all impressed on the upper surface, sharply and strongly raised on the lower, the midrib stout, main nerves 10 to 12 pairs, starting at about 75° with the midrib and curving upwards to anastomose near the margin, the pairs joined by fairly regular transverse nervules, and these again by the netted reticulations, petiole 1.5 to 2 in long, stout, channelled above. Cymes many-flowered, rounded, reaching 3.5 in long and 6 in broad, widely dichotomous, peduncle stout, flattened, 1 to 1.5 in long, further branch-peduncles also flattened when dry, bracts linear-subulate, very small, pedicels .05 to 1 in long, slender. Calyx hemispherical, .05 in long, tawny stellate pubescent without, glabrous within, with 4 minute teeth. Corolla-tube nearly cylindric, 1 in long, densely and closely grey-stellate tomentose without nearly glabrous within, lobes short, rounded, erect or slightly recurved, .04 in long, villous within. Stamens inserted at .04 in from base of tube, filaments .175 in long, anthers oblong, .075 in long, glandular punctate on the back. Ovary villous, style slender, bent, stigma broad, peltate. Drupe small, black, .06 in diam (immature)

SILANGOR Ridley 2787 MALACCA Maingay (K D) 1192 at Hulu Chembong, Derry 1005, Vern "Tampang Ben"

In Kew Herbarium, Maingay's specimen has been placed under *C arborea*, but the species differs in many respects. The venation of the leaves is very different as is the tomentum of much smaller stellate hairs, the leaves are nearly blunt, the tube of the corolla much longer, and its lobes much shorter, and we have no hesitation in describing it as a new species.

3 *CALLICARPA* ANGUSTIFOLIA, King & Gamble in Kew Bull 106 (1908) A shrub, reaching 8 to 9 ft in height, branchlets, inflorescence, and leaves beneath (also young ones above) clothed with appressed grey or ferruginous stellate tomentum, branchlets obscurely quadrang-

gular. *Leaves* subcoriaceous lanceolate, attenuately acute at apex, long attenuate at base and decurrent, upper surface dark, glabrous except when young, lower densely tomentose, grey-tawny or silvery, margins entire or rarely obscurely denticulate, slightly recurved 4 to 7 in long, 75 to 15 in broad, midrib stout, impressed above, prominent beneath; main nerves 9 to 15 pairs, rather irregular, starting at from 60° to 70° with the midrib and at once curving upwards to and along the margin, joined by subparallel transverse nervules; petiole .5 to .75 in long, the bases of the opposite leaves joined by a well marked ridge. *Cymes* few flowered, 5 to 75 in long and about .75 in broad, widely dichotomous; peduncles .25 to .35 in long; bracts linear subulate; pedicels very short jointed; flowers bluish pink. *Calyx* campanulate, .075 in long, densely stellate tomentose without glabrous within; teeth mucronulate. *Corolla* about twice as long as calyx, densely stellate tomentose without glabrous within; lobes rounded erect. *Stamens* inserted at or very near the base of the corolla tube; filaments slender, .15 in long scarcely or not exsert; anthers .06 in long oblong, much glandular dotted on both sides. *Ovary* villous; style slender, exsert; stigma capitate. *Drupe* glabrous globose, 1 in in diam, dark blue when ripe; pyrenes 4.

KEDAH on Langkawi Island, Ridley 8330. PERAK at Ipoh Curtis 3197, at Batu Kuran, Scortechini 1596 on the top of limestone hills 600 to 1000 ft., King's collector 7036, 8236.

The Kedah specimens have narrower leaves than the rest, with more slender branchlets. The species comes near to *C. angusta*, Schauer from the Philippines but differs in the almost quite entire leaves and larger flowers and fruit.

4. *CALLICARPA* REEVESII, Wall Cat 1830 (1828). A shrub the branches, petioles, under surface of leaves, and inflorescence covered with a soft, whitish grey or pale tawny, mealy tomentum of branched or stellate hairs. *Leaves* coriaceous lanceolate or elliptic lanceolate long acute at apex, attenuate at base and often slightly unequal, not decurrent; upper surface dark when dry, glabrous except the nerves, lower tomentose, margins entire for the lower third, above that shortly dentate serrate, 5 to 8 in long 2 to 3 in broad, midrib stout; main nerves 13 to 15 pairs, nearly regular, starting at an angle of 45° to 60° with the midrib and curving gently to the margin, each pair joined by rather obscure transverse nervelets, all slightly impressed above; petiole .75 in long. *Cymes* axillary, rounded, many flowered, widely dichotomous, reaching 4 in long and about 3 in broad, peduncles 1.5 to 2 in long, bracts linear subulate, 1 in long; pedicels short, slender, nearly glabrous, .05 to .1 in long, flowers purple? *Calyx* very

short, nearly glabrous but with a few stellate hairs and minutely glandular-punctate, very shortly 4-toothed *Corolla* twice as long as calyx, 1 in, lobes rounded, sparsely stellate-pubescent and glandular-punctate *Stamens* long exsert, filaments slender, anthers small, the connective glandular punctate *Ovary* rounded, very glandular, style very long, twisted, stigma peltate, large *Drupe* purple, small, 0.75 to 1 in in diam, nearly globose, pyrenes 4 Schauer in DC Prodr XI 641, Benth Fl Hongk 270, Clarke in Hook f Fl Br Ind IV 568 *C nudiflora*, Hook and Arn Bot Beech Voy 206, t 46

SINGAPORE near the Botanic Gardens, Munton 87 Ridley 6884 cult !—DISTRIB Tenasserim (?) (Falconer), Southern China

5 *CALLICARPA CANA*, Linn Mant 198 (1771) A shrub, branchlets, leaves beneath, and inflorescence covered with a down of whitish or grey or cinnamomeous stellate hairs branchlets obtusely quadrangular *Leaves* membranous ovate ovate elliptic or ovate lanceolate, shortly acuminate at apex, cuneately attenuate at base upper surface stellate tomentose when young, afterwards glabrous, shining and dark coloured, glandular punctate lower more or less whitish grey stellate tomentose, sometimes glabrescent, sometimes rugose, but more usually softly and conspicuously hairy glandular-punctate beneath the tomentum margins glandular-serrate, except at the cuneate base 4 to 7 in long, 2 to 3 in broad midrib rather slender, pubescent above main nerves 10 to 12 pairs, unpressed above, slightly raised beneath, starting at an angle of 40° to 45 with the midrib and curving upwards to the margin, joined by regular transverse nearly parallel nervules reticulations netted, impressed above, petiole 25 to 75 in long, upper part bordered by the decurrent margins of the blade *Cymes* many flowered, rounded, scarcely longer than the petioles, dichotomous peduncles about 25 in long bracts linear subulate, very small pedicels very short flowers pale red *Calyx* densely white stellate tomentose without, glabrous within, 0.5 in long teeth very minute *Corolla* campanulate tube glabrous, 0.75 in long lobes rounded, 0.25 in long, slightly white-villous without *Stamens* inserted close to the base of the tube filaments much exsert, twisted, 15 in long, anthers 0.2 in long the connective glandular punctate *Ovary* somewhat depressed style decurved, often twisted, as long as filaments, stigma funnel shaped *Drupe* globose, under 1 in long in diam, purple, pyrenes 4 Vahl Symb III 12, Roxb Fl Ind I 392, Wall Cat 1834, Blume Bijdr 817, Dene in Nouv Ann Mus III 401 Schauer in DC Prodr XI 643, Miq Fl Ind Bat II 885, Benth Fl Austral V 56, Clarke in Hook f Fl Br Ind IV 568 *C tomentosa*, Lamk Dict I 562 *C americana*, Lour Fl Cochinch 70, not of Linn *C adenanthera*, Br Prodr 513

*C Heyner*, Roth Nov Sp 82 Blume Bijdr 819 *C bicolor*, Juss in Ann Mus VII 77, Schauer in DC l c 642 *C sumatrana*, Miq l c 886 *C dentata*, Herb Roxb, Wall Cat 1834, not of Roth

PENANG Wallich 1834, Porter, Phillips NEGRI SEMBILAN Port Dickson, Sungai Ujong, Ridley 9574 MALACCA Mainqay (K D) 1190; Griffith Ridley 1589 SINGAPORE Kurz 2908 — DISTRIBUTION Malay Archipelago, Philippine Islands, Australia

Clarke in Fl Br Ind does not quote Bot Mag 2107, which Bentham had said probably represented a much more woolly plant though it might be a var of *cana* With this we agree

6 *CALLICARPA PEDUNCULATA*, B. Prodr Fl Nov Holl 513 (1810)  
A shrub with rather loose tomentum branchlets stellate pubescent  
Leaves membranous ovate, cuspidate acuminate at apex, rounded at base upper surface hispid puberulous above, especially on the nerves lower surface thinly whitish grey stellate tomentose margins serrulate on the upper two thirds 3 to 6 in long, 1.5 to 3 in broad midrib slender main nerves about 10 pairs curving gently upwards to the margin transverse nervules many and rather prominent petiole 2.5 to 5 in long Cymes rather dense, globose stellately woolly, on peduncles 2.5 to 7.5 in long, bracts and bracteoles linear subulate pedicels extremely short Calyx campanulate about .03 in long, stellate pubescent and glandular teeth short, thick Corolla funnel shaped, 1.25 in long tube nearly glabrous teeth rounded puberulous within Stamens inserted at the base of the tube filaments long exsert, slender, anthers elliptic reniform, the connective prominently gland-dotted Ovary rounded, glabrous, glandular style very long stigma thick, capitate Drupe dark purple, globose, 1 in in diam exocarp smooth Benth Fl Austral V 57 Clarke in Hook f Fl Br Ind IV 569 *C cuspidata* Roxb Fl Ind I 394 *C dentata*, Roth Nov Sp 81, Blume Bijdr 818 Wall Cat 6319 *C cana* Wall Cat 1834, No 2 *C lanata*, Schauer in DC Prodr XI 644, not of Linn or of Vahl *C thiaefolia*, Teyss & Binn fide Kurz MS

PENANG Wallich 1834, 2, 6319 DISTRIBUTION Malay Archipelago, Tropical Australia

7 *CALLICARPA LONGIFOLIA*, Lamk Diet I 563 (1785), and III t 69 (1791) A shrub, reaching 5 to 6 ft in height, branchlets, inflorescence, and leaves beneath rather sparsely covered with a short grey or tawny tomentum of stellate hairs branchlets obtusely quadrangular, slender Leaves membranous lanceolate, ovate lanceolate or occasionally oblong-lanceolate, long acuminate at apex, acuminate narrowed at base or rarely almost rounded, upper surface nearly glabrous, lower also some

times glabrescent, more usually sparsely stellate-hairy; both surfaces gland-dotted, margins serrulate except near the base, 3 to 7 in. long, 1.5 to 3 in. broad; midrib slender but prominent beneath; main nerves 10 to 12 pairs, starting at an angle of  $50^{\circ}$  to  $60^{\circ}$  with the midrib and curving upwards to and along the margin, joined by regular parallel transverse nervelets, all nerves and midrib more or less pubescent, petiole .5 to 1 in. long, slender. *Cymes* dichotomously divaricate-branched, rounded, 1 to 1.5 in. long, and up to 2 in. broad, peduncles .35 to .5 in. long, bracts linear-subulate, pedicels slender, short, glabrescent in fruit, flowers pale blue, purplish, pink or white (Benth in Fl. Austral) *Calyx* campanulate, .05 in. long, glandular-dotted and sparsely stellate-hairy, teeth 4, mucronulate. *Corolla* nearly twice as long as calyx, pubescent without, glabrous within, lobes rounded, erect or incurved, about .025 in. long. *Stamens* inserted at the very base of the tube, filaments long exsert, slender, twisted, anthers ovate-orbicular, the connective prominently gland-dotted. *Ovary* villous; style long, curved, often deflexed, stigma funnel-shaped. *Drupe* white, depressed, glandular, .05 to .07 in. in diam., pyrenes 4. Bot. Reg. t. 864, Roxb. Fl. Ind. I. 394, Brandis For. Fl. 369, Kurz For. Fl. II. 275, Schauer in DC. Prodr. XI. 645, Var.  $\beta$  *floccosa*, Benth Fl. Austral V. 57, Miq. Fl. Ind. Bat. II. 887, Koord & Val Bijdr. I. 176, Clarke in Fl. Br. Ind. IV. 570. *C. Roxburghiana*, Roem & Sch. Syst. III. Mant. 54. *C. attenuata*, Wall. Cat. 1835. *C. cana*, Wall. Cat. 1834 (partly). *C. dentata*, Wall. Cat. 6319 (partly).

KEDAH on Langkawi Island, Curtis 2134. PENANG (or SINGAPORE): Wallich 1835. PENANG at waterfall and half-way up hill, G. King; Stoliczka. PERAK Scortechini 1214, King's Collector (Kunstler) 80, 239. MALACCA Griffith (K.D.) 6039, Maingay (K.D.) 1191. SELANGOR: Curtis. JOHORE. at Jaffaria, G. King. SINGAPORE: Lobb, Hullett, Cantley 120, Schomburgk 54, G. Thomson 44, Walker 207, Deschamps (cult.) - DISTRICT Java, Sumatra, Borneo, to North Australia.

## 6 TECTONA, Linn. f.

Trees, stellately tomentose. *Leaves* opposite or whorled, large, entire, petioled. *Flowers* in dichotomous many-flowered cymes, in large terminal panicles, bracts small, narrow. *Calyx* campanulate, shortly 5- to 6-lobed, enlarged and becoming bladder-like in fruit and then ovoid or urceolate. *Corolla* small, white or bluish, tube short, limb with 5 to 6 short subequal spreading imbricate lobes. *Stamens* 5 to 6, attached near the base of the corolla-tube, equal, exserted,

anthers ovate or oblong with distinct parallel cells *Ovary* fleshy, 4-celled, each cell 1-ovuled, ovules attached near their bases to the axis, style linear, stigma shortly bifid *Fruit* a drupe enclosed in the accrescent calyx, exocarp spongy suberose or almost none, endocarp bony, thick, 4-celled *Seeds* erect, oblong testa membranous, albumen C, cotyledons fleshy and oily, radicle short, inferior — *DISTRIB* Species 3, one in India and Malaya, one in Burma, the third in the Philippine Islands

*TECTONA GRANDIS*, Linn f Suppl 151 (1781) A large deciduous tree, branchlets quadrangular, channelled, stellately tomentose, as are the young leaves, leaves beneath and inflorescence *Leaves* coriaceous-chartaceous, ovate elliptic or obovate, acute or shortly acuminate at apex, rounded acute or cuneate often decurrent at base, upper surface stellate tomentose when young, afterwards glabrescent scabrous and punctate with round whitish glands, lower with grey or tawny stellate tomentum, margins entire, 1 to 2 ft long, 6 in to 1 ft broad (leaves of seedlings and coppice shoots often much larger) midrib very stout, much raised beneath, main nerves 8 to 12 pairs, branched and curving upwards, joined by numerous prominent parallel transverse nervules, petiole 5 to 15 in long, very stout, rounded below, the bases of opposite petioles joined by a prominent ridge *Panicles* 1 to 3 ft in length and breadth, much spreading, 2 to 3 chotomous ultimate branches with a sessile fertile flower in the angle peduncles quadrangular, 0 to 3 in long, bracts lanceolate or spatulate, lower ones leafy, in pairs at the forks pedicels very short, fls vers white *Calyx* in flower globose campanulate 125 in long, lobes 5 or 6, 05 in long, acute calyx in fruit ovoid, ventricose reticulate, often 1 to 15 in in diam, with small teeth nearly closing the orifice *Corolla* white, glabrous, 5 to 6 lobed, tube about 1 in long limb spreading lobes subequal *Ovary* densely hairy *Drupe* subglobose, 5 to 75 in in diam, indistinctly 4-lobed, pericarp soft, with dense felted stellate or branched hairs, endocarp thick, bony *Seeds* obovoid, testa thin, cotyledons conform with the seed, fleshy radicle very small *Geogr* Fruct I 275, t 57, Roxb Cor Pl I 10, t 6, and Fl Ind I 600 Wall Cat 772, Schauer in DC Prodr XI 622, Dalz & Gibs Bomb Fl 199, Bocq Rev Verb 99, t 10, Bedd Fl Sylv Madr t 250, Brandis For Fl 354, t 44 Kunz, For Fl II 259 Bl Bijdr 820, Miq Fl Ind Bat. II 901, Clarke in Hook f Fl Bt Ind IV 570, Cooke, Fl Bomb. II 424, Prain Beng Plants, 828, 'Koord & Val Bijdr VII 165, Briquet in Engl & Prantl Nat Pflanzenfam IV 3A, 167, t 63 "*Theka*," Rheede Hort Mal IV 57, t 27, Rumph Herb Amb III t 18

**MALAY PENINSULA** Burma to Malacca, *vide* Fl. Br. Ind. &c.—  
**DISTRIB** India, Burma, Siam, Sumatra, Java The teak-tree, often cultivated (MALACCA *Mangay*, (K.D) 1193).

We include here the teak tree, on the authority of the Fl. Br Ind., but there are no specimens from the Malay Peninsula, from wild trees, in either of the herbaria of Kew or Calcutta Mr Ridley informs us that, so far as he is aware, the teak tree is nowhere indigenous in the Malay Peninsula.

## 7 PREMNA, Linn

Trees or shrubs, sometimes climbing *Leaves* opposite or sometimes in whorls of 4, entire or toothed *Flowers* in corymbose or panicled or sometimes thyrsoid, pubescent, terminal cymes, bracts small, narrow, bracteoles 0 *Calyx* small, campanulate, truncate, 2 lipped or shortly 2 to 5 toothed *Corolla* small, tube short, often villous within, limb 2 lipped, 5-lobed or subequally 4-lobed *Stamens* 4 didynamous, inserted below the throat of the corolla-tube, rarely exserted, anthers ovate or rounded, the cells parallel or divergent *Ovary* 2- or 4 celled, 4-ovuled, style linear, stigma shortly bifid *Fruit* a small drupe, surrounded below by the calyx, globose or obovoid, mesocarp thin, fleshy, endocarp of 1 pyrene, hard, undivided, 4 celled or by abortion 1 to 3-celled, with a central cavity *Seeds* oblong, testa thin, albumen 0, cotyledons flat, radicle inferior—  
**DISTRIB** Species 40 or more, in the warmer regions of the Old World

**Calyx** clearly 2 lipped —

Upper lip of calyx 3 lobed, lower 2 lobed —

Leaves prominently crenate dentate, ovate or ovate deltoid, cordate . . . 1 *P littoralis*

Leaves entire or very obscurely and distantly toothed, ovate . . . 2 *P flavescens*  
 var *rubens*

Upper lip of calyx 2 lobed —

Lower lip of calyx entire or obscurely lobed, corolla tube funnel shaped —

Cymes in panicles of interrupted spikes, leaves subsessile 3 *P Desryana*

Cymes in corymbose panicles leaves petioled —

Corymbs small, under 2 in in diam, leaves under 3 5 in long . . . 4 *P integrifolia*  
 var *angustior*

Corymbs rather large, reaching 5 in in diam, leaves over 3 in long . . .

Corymbs lax —

Main nerves of leaves 6 to 8 pairs; leaves acuminate at apex, truncate or cordate at base, calyx tube puberulous . . . 5 *P fatida*

- Main nerves of leaves 5 to 6 pairs, leaves obtuse or very shortly acute or acuminate at apex —
- Leaves ovate or elliptic, membranous chartaceous .. 6 *P. divaricata*
- Leaves obovate or orbicular, chartaceous .. 7 *P. trichostoma*
- Leaves elliptic or elliptic lanceolate, coriaceous chartaceous .. .. 8. *P. perakensis.*
- Main nerves of leaves 4 to 5 pairs, leaves broadly elliptic .. .. 9 *P. punctulata.*
- Corymbs compact —
- Corymbs 8 in in diam, leaves membranous, ovate-acuminate, cordate or truncate at base, yellowish brown when dry .. .. 10 *P. cordifolia*
- Corymbs 4 to 5 in in diam, leaves coriaceous, elliptic or elliptic lanceolate shortly acuminate at apex, attenuate at base, reddish brown when dry 11 *P. Wrayi*
- Corymbs 8 in in diam, leaves membranous, broadly ovate, acuminate at apex, truncate or cordate at base reddish brown when dry .. 12 *P. sterculifolia*
- Lower lip of calyx 2 lobed, calyx tube subquadrangular, leaves under 3 in long, corymbs rather small, corolla tube slender .. .. 13 *P. Ridleyi*
- Calyx not 2 lipped —
- Calyx truncate or very obscurely lobed, leaves coriaceous, elliptic, obtuse at apex, rounded at base .. 14 *P. Kunthii*
- Calyx subequally 5 lobed, leaves large, stellate tomentose, as are branchlets and inflorescence .. 15 *P. pyramidalis*

1 *PERLMANIA LITORALIS*, King & Gamble in Kew Bull 107 (1908)

A small tree, branchlets nearly as thick as a goosequill, obscurely angled, tawny-pubescent, with small lenticels, the nodes marked by a ridge connecting the petioles. Leaves chartaceous-coriaceous, ovate or ovate-deltoid, acuminate at apex, cordate at base, the sinus 2 to 5 in deep, both surfaces glabrous except the nerves, which are puberulous, margins acutely crenate dentate except in the curves of the sinus, 4 to 6 in long, 2 to 3 in broad, midrib strong, raised beneath, main nerves 7 to 9 pairs, the lowest 1 to 2 pairs starting from the base and divaricate, the rest starting at an angle of about 50° with the midrib and curving upwards, transverse nervules distant, few, not prominent, petiole 1 to 1.5 in long, slender, puberulous (gynous in terminal), spreading, 3 dichotomous, tawny pubescent corymbs, reaching 4 in in length and 6 in in breadth, peduncles .75 to 1 in long, primary branches up to 1.5 in long, rest gradually shorter, bracts linear, persistent, the lowest sometimes leaf like, pedicels very short, with a pair of minute bracteoles below the calyx, flowers very pale green. Calyx .075 to 1 in long, 2-lipped, upper shortly 3-lobed, lower longer, 2-lobed, lobes rounded, tube pubescent without. Corolla 2-lipped, half as long



again as the calyx upper lip broad, bifid, lower 3-lobed, the midlobe longest, all lobes rounded, tube glabrous without, also within except the belt of thick villous hairs just below the mouth *Stamens* (in bud) included, filaments short, thick, anthers reniform, very shortly 1- to 2 mucronate *Ovary* subglobose, depressed, glabrous except for a few glandular scales, style thick, stigma very shortly 2-fid *Drupe* globose, glabrous, fleshy, endocarp tuberculate, cells 4, one only usually fertile *Seed* oblong, acute at each end, testa membranous with a corky outer layer, cotyledons shortly oblong, obtuse, cordate, 0.5 in long, fleshy

PERAK sea-coast at Matang Wray 2719

2 PREMNA ILAVLSCENS, Ham, Wall Cat 2649 (1828), Clarke in Hook f Fl Br Ind IV 578 Prain Beng Plants, 831

VAR *rubens* Clarke in Hook f Fl Br Ind IV 578 (1885) A shrub or small tree (a climber - *Koorders & Valetton*), branchlets the size of a crow quill, grey pubescent, obscurely angled *Leaves* chartaceous when dry ovate or ovate-oblong, acuminate at apex cordate or rounded or somewhat cuneate at base, upper surface shining, sparsely setulose especially on the nerves, lower surface tawny-pubescent, entire or the upper half obscurely and distantly toothed, 4 to 6 in long, 2 to 2.5 in broad, midrib rather stout raised beneath, main nerves 6 to 9 pairs, the lowest 1 or 2 (first very small) pairs from the base, at an angle of about 40° with the midrib, curving upwards to and along the margin the upper ones joining in an intramarginal looped nerve which ends in the midrib at the acumination, transverse nerves many, conspicuous on the lower surface petiole 1 to 1.5 in long, slender puberulous *Cymes* in terminal tawny pubescent corymbs about 4 in in diam branches 3 then 2 dichotomous peduncle 1 to 2 in long bracts small, linear pedicels short, under 0.5 in long flowers greenish *Calyx* campanulate, 0.5 to 1 in long, pubescent without, 2 lipped, upper lip 3 lobed lower 2 lobed, all lobes obtuse nearly equal, fruiting calyx saucer shaped *Corolla* funnel shaped, 1 to 1.5 in long, 2 lipped, upper lip shortly bilobed, reflexed, lower 3 lobed, the midlobe longest and oblong, tube much villous hairy within *Stamens* exsert, filaments flattened anthers reniform, the cells nearly parallel *Ovary* glabrous, depressed, style slender, as long as the stamens, stigma 2 lobed, the lobes slender, horizontally spreading *Drupe* globose, 1.5 to 2 in in diam, with numerous shining glands, endocarp tuberculate *Seed* oblanceolate about 1 in long, usually one only in each drupe, cotyledons fleshy ovate-oblong, radicle thick *P. lucidula*, Miq Fl Ind Bat II 898 Koord & Val Bijdr VII 188

MALACCA Ayer Punnas, Griffith (K D) 6020 — DISTRIB Burma,

Java (*Teysmann* No 10, *Zollinger* 645, *Koorders* 31425  $\beta$ ), Sumatra (*Forbes* 2621—a climbing shrub)

3 *PREMNA DERRYANA*, King & Gamble in Kew Bull 107 (1908) A climbing (?) shrub, branchlets smooth, brown, with large circular or elliptic lenticels. *Leaves* membranous when dry, subsessile, elliptic or obovate, shortly and obtusely acute at apex, attenuate and obscurely auricled at base, both surfaces shining, glabrous margins entire, 5 to 8 in long, 3.5 to 4 in broad midrib slender, impressed above, raised beneath, main nerves 7 to 8 pairs, often branched, curving upwards to and along the margin where they anastomose transverse nervules slender, and with the minor reticulations rather prominent. *Cymus* in terminal panicles of three to four spikes, each spike with many interrupted glomerules of sessile flowers, the inflorescence 6 to 8 in long, main peduncles 2 to 2.5 in long, secondary peduncles .75 to 1 in long bracts lanceolate, at the main divisions .25 in long. *Calyx* deeply bilabiate, the upper lip entire at first, afterwards 2 lobed, 1.25 in long, the lower one entire, 1 in long tube golden pubescent without. *Corolla* tube rather longer than the calyx, glabrous except for a few villous white hairs in the throat within, lips 2, posterior lip emarginate erect, anterior lip 3-lobed, the lobes obtuse, the midlobe the longest. *Stamens* 4 long exserted filaments puberulous, twisted anthers reniform, cells opening by oblong pores. *Ovary* glabrous, depressed cells 4, one only apparently seed bearing style slender, as long as the stamens stigma of 2 slender horizontal lobes. *Drupe* not seen

PERAK on Larut Hills, *Derry* (*Curtis* 3701)

4 *PREMNA INTIGRIHOLIA*, Linn Mant II 252 (1771) Cooke Fl Bomb II 426, Plain Beng Plants, 830. *P. serratifolia*, Linn l c 253, Schauer in DC Prodr XI 632, Bedd For Man in Flor Sylv CLXXII, Trimen Fl Ceyl III 352. *P. spinosa*, Roxb Fl Ind III 77. *P. sambucina*, Wall Cat 1775, Schauer, l c 631. "*Gumma littorea*, Rumph Herb Amb III 209, t 134

VAR *angustior*, Clarke in Hook f Fl Br Ind IV 574 (1885) A small shrub, 3 to 6 ft in height, branchlets nearly glabrous, the size of a crow-quill, terete. *Leaves* elliptic or elliptic-ovate, obtusely acute at apex, rounded or narrowed at base, glabrous on both sides except on the midrib and main nerves, margins entire or obscurely crenate-dentate in the upper half, 2 to 3.5 in long, 1 to 2 in broad, midrib slender, puberulous above and raised, tawny villous along the sides and in the axils below, main nerves 4 to 5 pairs, lowest 2 pairs rather close to the base and long, the rest more spreading and curved upwards to join in an obscure intramarginal looped nerve few transverse nervules and reticulations obscure, petiole slender, puberulous, .25 to .5 in long

*Corymbs* puberulous, terminal or pseudo-axillary in upper axils, up to 2 in broad, sessile or on peduncles up to 1.5 in long, branches at first 3- afterwards 2 chotomous, bracts minute, lanceolate, pedicels very short, flowers greyish-white *Calyx* 2 lipped, upper lip with 2 triangular lobes, lower obtuse, obscurely 2 to 3-dentate, tube rugose and puberulous without, .05 in long *Corolla* tube cylindric, 1 in long, puberulous, limb 2-lipped, upper lip subequally 3-lobed, the middle lobe slightly the longest and incurved, lower lip rounded obtuse, rather shorter, scarcely .05 in long, upper half of tube within thickly white-villous *Stamens* slightly exsert, anther cells slightly divaricate *Drupe* obovoid, depressed at top, rugose and obscurely ribbed, .15 in long, endocarp ribbed, bony, 4-celled *Seeds* ovoid, acute, testa pale, slightly corky, cotyledons flat, shallowly emarginate at top

KEDAH Langkawi Island, *Curtis* 2955 PENANG *Kunstler* (*King's Collector*) 1670, *J. Scott* PROVINCE WILLSLEY at Batu Kawan, *Ridley* 9353 MALACCA *Griffith* (K D) 6030, *Mungray* (K D) 1201 SINGAPORE *Ridley* 8900 —DISTRIB Amherst in Tenasserim, *Falconer*, tidal forests of Tavoy, *W. A. Hearnsey*

5 *PRIMA FETIDA*, Reinw. ex Blume Bijdr. 816 (1825) A large shrub or small tree with spreading branches, reaching 20 to 30 ft in height bark white, branchlets subtetragonous to cylindric, tawny pubescent, as are the young leaves, the nerves of the mature leaves, and the inflorescence, nodes with a prominent villous ridge joining the bases of the petioles *Leaves* chartaceous, ovate, sometimes ovate-lanceolate, rarely ovate oblong, shortly acuminate at apex, rounded or truncate or slightly cordate at base, shining on the upper surface and dark when dry, paler, often almost grey on the lower surface, margins entire or slightly repand above, 3 to 6 in long, 2 to 3.5 in broad, midrib slender prominent beneath main nerves 6 to 8 pairs, the lowest 2 pairs almost from the base, the lowest spreading, the rest at about 45° with the midrib, gently curving to and along the margin, transverse nervules rather distant, irregular, petiole .75 to 2 in long *Corymbs* lax, reaching 5 in long and broad, subsessile or on about 1 in long peduncles, 3 chotomous below, 2 chotomous above, the branches divaricate, bracts very small, linear, pedicels short, under .05 in long, flowers white *Calyx* cup-shaped, .05 to .075 in long, 2-lipped, upper lip acutely 2 lobed, lower very shortly 3-lobed, tube puberulous without *Corolla*-tube funnel-shaped, 1 in long, densely white-villous in the upper half within, obscurely 2-lipped, upper lip short, lower 3-lobed, recurved, the midlobe longest and incurved *Stamens* attached to the throat of the corolla-tube, shortly exsert, anther cells elliptic with elliptic pores

*Ovary* depressed, glabrous, style short, stigma very shortly bifid  
*Drupe* globose, 4-sulcate, epicarp rugose, cells 4, all or fewer with seeds  
*Seeds* fusiform, keeled, testa pale Schauer in DC Prodr XI 630, Miq Fl Ind Bat II 891, Koord & Val Bijdr VII 192  
*P opulifolia*, Miq l c 898 *Gumura fatida*, Hassk in Florâ, 25 beibl p 26  
*"Gumura domestica,"* Rumph Herb Amb III 208, *fide* Miq & Schauer

KEDAH near sea level, *Kunstler* (*King's Collector*) 1737 PERAK on the coast at Matong, *Wray* 2493, near sea-level, *Kunstler* (*King's Collector*) 1016 JOHORE at Batu Pahat, *Ridley* 11137 SINGAPORE cult, *Ridley* 6893 — DISTRIBUTION Java (Koorders 20179  $\beta$ , *Zollinger* 2740), Borneo (*Haviland & Hose* 3394, &c)

We follow Koorders & Valetton in putting *P opulifolia*, Miq, under *P fatida*, Reinw. But our specimens agree better with the description of *P opulifolia* than with those of *P fatida*. As pointed out by Koorders & Valetton, the description of the calyx given for *P fatida* as 'obsolete sub 4 dentatus, vulgo 3 denticulatus quarto dente abortivo' is abnormal. That given for *P opulifolia* is quite correct.

6 *PREMNA DIVARICATA*, Wall Cat 1781 (1828) A climbing shrub, branchlets slender, terete, nearly black when dry, with sparse rounded or oblong lenticels. *Leaves* membranous when young, chartaceous when older, ovate or elliptic, briefly acute or bluntly acuminate at apex rounded or attenuate sometimes subcordate at base, upper surface slightly shining, glabrous except the nerves, lower dull, glabrous except for villous hairs along the midrib and in the axils of the main nerves, obscurely dotted, entire 3 to 5 in long, 2 to 3.5 in broad, midrib slender, slightly impressed above, main nerves 5 to 6 pairs, at an angle of 40 to 60 with the midrib, the lowest 1 to 2 pairs from near the base, curved upwards to join in loops near the margin, transverse nervules few, irregular, inconspicuous, as are the finely netted reticulations, petiole 5 to 1.5 in long, channelled above. *Corymbs* divaricate, many flowered, slightly puberulous, terminal, reaching in fruit 5 in in diam, sessile or on peduncles 1 to 2 in long, 3-chotomous below, 2-chotomous above, bracts linear lanceolate, small, the lowest sometimes leafy, pedicels very short, flowers greenish white. *Calyx* cup-shaped, prominently 2-lipped, the upper lip much longer than the lower, with 2 rounded 0.3 in long lobes, the lower entire or shortly 3-toothed, tube rugose without and glandular-dotted. *Corolla* tube cylindric, 0.75 in long, puberulous without, white villous within on the upper half, limb 2-lipped, upper lip short, retuse, broad, lower lip 3-lobed, the midlobe longest, up to 0.75 in. *Stamens* inserted near the mouth of the corolla-tube, slightly exsert, anther-cells divaricate

*Ovary* rounded, style as long as stamens, stigma very shortly bifid. *Drupe* ovoid, .25 in. long, epicarp smooth; pericarp fleshy, endocarp ribbed, pyrenes 3- to 4-celled. Schauer in DC. Prodr. XI. 681; Clarke in Hook. f. Fl. Br. Ind. IV. 575 *P. lucidula*, Kurz For. Fl. II. 263, not of Miq

PENANG beach at Tanjong Bunga, *Curtis* 215 DINDINGS: Pangkore Island, *Ridley* 7180. MALACCA: *Maingay* (K.D.) 1198-9, at Sungei Hudang, *Goodenough* 1350. SINGAPORE gardens in scrub, *Ridley* 10841 —DISTRIB. Java

7. *PREMNA TRICHOSTOMA*, Miq. Fl. Ind. Bat. II. 892 (1856). A large climbing shrub, reaching to a considerable height, the stem reaching 3 to 5 in in diam., branchlets thick, shining, glabrous, pale brown. *Leaves* at first chartaceous, afterwards subcoriaceous, very variable, ovate- or obovate-elliptic, sometimes nearly orbicular, shortly acuminate at apex or sometimes attenuately acute, rounded or subcordate or cuneate at base, glabrous on both surfaces except on the nerves, margins entire or sometimes undulate at apex, 4 to 7 in long, 2 to 5 in broad, midrib slender, raised beneath, main nerves 5 to 6 pairs, at from 30° to 45° with the midrib, the lowest pair from the base, the next rather close, the rest distant, all straight at first, then branched outwards and curved to join near the margin, raised on both surfaces when old transverse nervules many, petiole 75 to 1 in long, puberulous. *Corymbs* terminal, reaching 4 to 5 in in diam., puberulous, sessile or on 1 in long peduncles, branches 3- afterwards 2-chotomous, thickening in fruit, bracts lanceolate, short, pedicels none, flowers cream-coloured. *Calyx* cup-shaped, obscurely tetraginous, puberulous without, 05 to 07 in long, 2-lipped, the upper lip 2-lobed, the lower faintly 2-toothed or entire, all teeth less prominent in fruit. *Corolla* campanulate, tube 1 in long, densely villous within in the upper half, limb subequally 4-lobed, the lobes rounded, lower one slightly smaller, all recurved. *Stamens* inserted at the mouth of the corolla-tube, long exsert, filaments slightly flattened, anther-cells small, rounded, didymous, opening by elongated pores. *Stigma* 2-fid, the divisions divaricate, rather long. *Drupe* pyriform, 4-celled, one cell only enlarged and seed-bearing. *Seeds* oblong, flattened, testa membranous. Koord. & Val. Bijdr. VII. 184. *P. parasitica*, Clarke in Hook. f. Fl. Br. Ind. IV. 574, not of Blume

KEDAH Langkawī Island, *Curtis* 2796. PERAK at waterfall, 300 ft., *Wray* 2403, *King's Collector* 3008, 10310, *Scortechini* 192 MALACCA *Griffith* 6019. JOHORE *Ridley* 11136. SINGAPORE *Ridley* 5026, 6828, 8914 —DISTRIB. Borneo (*Haviland*)

8 *PREMNA PERAKENSIS*, King & Gamble in Kew Bull. 107 (1908)

A shrubby climber branches brown, sparsely lenticellate glabrous, smooth. *Leaves* chartaceo-coriaceous, elliptic oblong or lanceolate, sometimes obovate, shortly and bluntly acute at apex narrowed or cuneate at base both surfaces glabrous, even the nerves slightly rugose margins entire, slightly recurved 3 to 5 in long 1.5 to 2.25 in broad, midrib stout, impressed above, raised beneath main nerves 5 to 6 pairs also impressed above and raised beneath the lowest pair opposite and from close to the base starting at from 25 to 40 with the midrib and nearly straight, curving only near the margin where they form a looped intramarginal nerve transverse nervules many inconspicuous petiole 5 to 7.5 in long glabrous, channelled above *Corymbs* spreading tawny puberulous, reaching 3 in in length and in diam, 3-chotomous, afterwards 2 chotomous, sessile or on stout peduncles 2 to 3 in long bracts ovate lanceolate, those of lower divisions leafy pedicels 0, flowers pale green with white stamens *Calyx* obscurely quadrangular pubescent nerved, the nerves prominent in fruiting examples, 0.6 in long 2 lipped, the upper lip 2 lobed, the lower entire or obscurely 2 lobed *Corolla* funnel shaped the tube 1.25 in long, densely white villous in the upper half limb subequally 4 lobed the lobes recurved ciliate *Stamens* inserted at the mouth of the corolla tube, long exsert filaments somewhat flattened anther cells nearly globose, didymous, opening by circular pores connective glandular *Ovary* glabrous style long exsert stigma divaricately 2 fid *Drupe* smooth pyriform, one cell only fertile *Seed* ovate oblong flattened testa membranous.

PERAK in rocky places in forest, at 800 to 1000 ft King's Collector 7247, 10738 *Scottichum* 516

This species comes very near to *I. trichostoma* but has several important points of difference such as the narrower thicker leaves with glabrous nerves the darker branches the markedly nervose fruiting calyx the large bracts and the round openings of the anther cells so that we have preferred to describe it as a species instead of as a variety. In the corolla it nearly agrees, as also it does in the absence of pedicels and the one seeded pyriform drupe.

9 *PRIMNA PUNCTULATA*, Clarke in Hook f Fl Br Ind IV 575 (1885). A shrub or small tree, branchlets dark brown terete lenticellate. *Leaves* chartaceous broadly elliptic, suddenly shortly acuminate at apex, rounded at base upper surface glabrous shining lower surface paler, reddish, punctulate, pubescent on the nerves margins entire, 4 to 6 in long, 2 to 3 in broad, midrib prominent, main nerves 4 to 5 pairs the lowest pair very small, close to the base, the next pair a little above the rest more distant, all curving upwards to

anastomose near the margin, transverse nervules very prominent, as is the netted reticulation, petiole 1 in long, slender, channelled above. *Corymbs* many-flowered, terminal, paniculate, pubescent, 4 to 5 in. in diam, lower bracts 5 in long, linear-oblong, pedicels very short or none. *Calyx* 0.6 in long, minutely grey-pubescent and glandular, 2-lipped, upper lip 2-toothed, lower lip also 2-toothed or subentire. *Corolla* tubular, 1 in long, villous at the throat within, glabrous below, lobes short, rounded. *Stamens* included, filaments inserted in the middle of the tube, short, anthers reniform, cells slightly divergent. *Ovary* glabrous, style rather short, stigmatic lobes slender, recurved. *Drupe* not known

MALACCA *Maingay* (K D) 1200

10 *PREMNA CORDIFOLIA*, Roxb Fl Ind III 78 (1832) A shrub, reaching 8 to 12 ft in height, with dark brown bark on the old wood, branchlets light brown, darker when dry, the size of a crow-quill, glabrous, terete. *Leaves* membranous, ovate or ovate-cordate, acuminate at apex, rounded or cordate at base, upper surface shining, bullate, drying brown, glabrous except on the midrib and main nerves, lower surface also nearly glabrous, yellowish-brown when dry, margins entire, slightly recurved, 3 to 7 in long, 2 to 3 in broad, midrib slender, but strongly raised beneath, main nerves 5 to 6 pairs, at about 50° with the midrib, at first nearly straight and then curving to join in a looped intramarginal nerve, each pair on the same side joined by few (4 to 5) irregular transverse nervules and lesser reticulations, petiole slender, 5 to 1 in long, upper side tawny-puberulous. *Corymbs* many-flowered, dense, terminal, tawny-puberulous, about 3 in long, and the same or rather more in diam, peduncles 1 to 3 in long, with tawny-puberulous leaf-like bracts, bracts of corymb small, lanceolate, acute, branches at first decussate, then dichotomous, pedicels very short, rather thick, flowers greyish-white. *Calyx* 1 in long, 2-lipped, upper lip 2-lobed, lower entire, lips short, broad, rounded. *Corolla*-tube 2 in long, funnel-shaped, densely villous within, limb 2-lipped, anther-cells shortly divergent. *Ovary* glabrous, style as long as corolla-tube. *Drupe* obovoid, slightly depressed at top, exocarp thin, shining, black, mesocarp fleshy, endocarp hard, pitted, 3- to 4-celled, one cell usually only fertile. *Seed* ovoid acute, cotyledons flat, orbicular, 1.25 in in diam. Walp Rep IV 94, Schauer in DC Prodr XI 632, partly, not of Wight or Bedd, Miq Fl Ind Bat II 895, in part only, Clarke in Hook f Fl Br Ind IV 572

PENANG at Tanjong Bunga, *Curtis* 861, *Kunstler* (King's Collector) 1480 PROVINCE WELLESLEY at Krian, *Ridley* 9386 SINGAPORE *Lobb*

11 *PREMNA WRAYI*, King & Gamble in Kew Bull 108 (1908) A climbing nearly quite glabrous shrub, branches stout, obscurely quadrangular, dark brown, branchlets similar, darker, smooth. *Leaves* coriaceous, elliptic or elliptic lanceolate, gradually acuminate at apex, attenuate at base, often unequally, shining and glabrous on both surfaces except for small tufts of hair in the axils of the main nerves beneath, olive brown when dry, entire, 4 to 8 in long, 2 to 4 in broad, midrib stout, impressed above, prominently raised beneath, main nerves 6 to 8 pairs, impressed above, raised beneath, the lowest pair very faint from the base and close to the margin, the next stout and shortly above, the rest distant at about 50 with the midrib, curving upwards to and along the margin, the upper ones joined in a looped intramarginal nerve, transverse nervules straight and fairly regular, reticulations rather prominent on the upper surface when dry. *Petiole* 5 to 2 in long, channelled above. *Corymbs* dense and compact, about 4 to 5 in broad at top, glabrate or very minutely puberulous on upper branches and calyx. *lower branches* 3 dichotomous, upper 2 dichotomous, much ramified and curving inwards, peduncle about 1 in long stout, main branches 1 to 1.5 in long. *bracts* very small, linear, the lower ones leafy, pedicels about 0.5 in long to the joint below the calyx-tube. *Calyx* deeply 2 lipped, the upper lip sharply 2 lobed, the lower 3 toothed, the lobes spreading in the fruiting stage, tube rugose. *Corolla* not seen. *Drupa* obovoid, 2.5 in long and broad, epicarp rugose, glandular-dotted, pyrenes 4. *Seeds* plano convex, ovate, 1.75 in long. *testa* white corky, cotyledons oblong, retuse at tip, flat, fleshy, 1.5 in long. *radicle* 0.25 in.

*PRERAK* at Tapa, Wray 200

At first sight this species resembles *P. Kunstleri* in its coriaceous shining leaves and stout branches, but differs in the more compact corymbs and the deeply lobed calyx.

12 *PREMNA STERCULIFOLIA*, King & Gamble in Kew Bull 108 (1908) A stout, tree-like, climbing shrub, branches reddish brown, smooth, branchlets terete, purple, sparsely scabridly puberulous. *Leaves* membranous, ovate, acuminate at apex, truncate or somewhat cordate at base, both surfaces reddish brown when dry. *upper* sparsely setulose and pubescent on the nerves, lower slightly puberulous, sparsely glandular-dotted, 4 to 9 in long, 3 to 5 in broad, midrib prominent, channelled above, raised beneath, main nerves 6 pairs, raised beneath, the 2 lowest pairs from close to the base spreading, the rest at about 40° with the midrib, curved upwards to and along the margin, joined by prominent transverse nervules, *petiole* 2 to 4 in long, channelled above. *Cymes* in large spreading, slightly puberulous.



many-flowered paniculate corymbs reaching 9 in long and 8 in broad, peduncles stout, 3 to 4 in long, branches 3-chotomous at first, afterwards 2 chotomous, ultimate cymules crowded, bracts linear, very small, caducous, pedicels short, slender, flowers pale green *Calyx* campanulate, obscurely 2 lipped, the upper lip nearly entire, the lower entire or obscurely toothed tube 0.5 in long, glandular and puberulous, scaly without *Corolla*-tube funnel shaped, puberulous, 1.25 in long, densely white villous within except at the base, 2 lipped, upper of 1 short recurved lobe, lower of 3 recurved obtuse lobes, the midlobe the longest, 0.75 in long *Stamens* exsert, the filaments twisted, anthers ellipsoid, divaricate *Ovary* glabrous, depressed, style slender, nearly 2.5 in long, stigma bifid with slender spreading lobes *Drupe* globose, depressed, much tuberculate and red when dry, pyrene woody, tuberculate, roughly 4 angled *Seeds* usually 1 only perfect, obovate, 1 in long, testa membranous cotyledons conform to the seed, fleshy, radicle pointed

PERAK at waterfall, Wray 1828 *Scortechini*, King's Collector 3067, 7531, 8373

VAR *cordata*, King & Gamble, l c *Leaves* more deeply cordate at base branches of inflorescence more distant than in type, calyx with upper lip 2 lobed, the lower entire or obscurely toothed

PLRAK *Scortechini* 273

13 PREMNA RIDLEYI, King & Gamble in Kew Bull 109 (1908) A climbing shrub, branches stout, with grey shining bark, branchlets slender, terete, brown *Leaves* chartaceous, opposite or sometimes one of each pair rather higher than the other, ovate, ovate-oblong or slightly obovate, rounded or very shortly acute at apex, rounded or attenuate often unequally at base both surfaces glabrous and dull, margins entire, 1.5 to 3 in long, .75 to 1.5 in broad, midrib slender, main nerves 6 to 7 pairs, the lowest 1 or 2 pairs from the base, at an angle of 30° to 40° with the midrib, straight at first, then gently curved to and along the margin, transverse nervules and reticulations faint, petiole slender, .25 to .5 in long *Corymbs* terminal, 1.5 to 5 in long, and 2 to 5 in broad, many flowered, tawny-puberulous, peduncles .75 to 2 in long, branches at first 3- afterwards 2-chotomous, bracts linear lanceolate, small, pedicels none or minute, flowers greenish-white *Calyx* campanulate, subquadrangular, 2-lipped, each lip 2-lobed, with minute teeth, tube .05 in long, puberulous *Corolla* tube somewhat tubular, slender, 1 in long, puberulous in the lower half within, long white villous in the upper, lobes 4, equal, oblong, rounded at tip, .05 to .075 in long, incurved at length *Stamens* inserted, 2 upper at the top of the throat of the corolla tube, 2 lower lower down, filaments slightly flattened, long exsert, anthers small, cells rounded, slightly

divaricate, connective glandular on the back. *Ovary* rounded, glabrous, style as long as stamens, .2 in., stigma bifid, the lobes .025 in. long, usually recurved. *Drupe* not seen.

PERAK. *Scortechini* 455. SINGAPORE garden jungle, *Ridley* 6826.

14. *PREMNA KUNSTLERI*, King & Gamble in Kew Bull 109 (1908) A large shrub or small tree, nearly quite glabrous, sometimes climbing, branches stout, thick, purplish-brown, branchlets the size of a quill, terete, glabrous, sparsely lenticellate. *Leaves* coriaceous, elliptic, sometimes elliptic-oblong or obovate, obtuse at tip with a short blunt abrupt acumination, rounded or subcordate at base, both surfaces glabrous, more or less shining when dry, margins entire, slightly recurved, 4 to 7 in. long, 2.5 to 4 in. broad, midrib very stout, impressed above, raised prominently beneath, main nerves 5 to 7 pairs at from 50° to 60° with the midrib, the lowest pair small, from the base, the second from close above it, the rest more distant, all curved upwards to join in a looped intramarginal nerve and joined by four irregular transverse veinlets, reticulations minutely netted, forming a prominent network on the upper surface when dry, petiole .75 to 1.25 in. long, smooth but channelled above. *Corymb* terminal, spreading, long-branched, 3-chotomous below, 2-chotomous above, glabrous except for very minute sparse tawny pubescence on the upper branches and calyx-tube, sessile or pedunculate, the peduncle or primary branches 3 to 4 in. long, the whole corymb reaching 7 in. in length and 5 in. in breadth, bracts linear or linear-lanceolate, the lower ones leafy, pedicels very short, less than .05 in. to the joint under the calyx-tube, flowers pale greenish-white. *Calyx* cup-shaped, .075 in. long, truncate or very obscurely 2-lipped, in fruit very shallow and almost quite entire. *Corolla*-tube tubular, .125 in. long, the lower half glabrous and almost hyaline, the upper shortly white-villous, limb 2-lipped, lower lip 3-lobed, the midlobe longest, the two others and the upper lip equal, all erect or incurved. *Stamens* shortly exsert, attached just below the mouth of the corolla-tube, anther-cells rounded, slightly divaricate, pores elliptic. *Ovary* glabrous, depressed, 4-celled, style as long as stamens, stigma very shortly bifid. *Drupe* obovoid, faintly ribbed, .25 in. long, epicarp smooth, waxy-white (*Kunstler*), pyrenes 4-celled, one or more cells fertile. *Seed*s obovate, plano-convex, .15 to .2 in. long, testa white, corky, cotyledons flat, fleshy, .15 in. long, .1 in. broad, retuse at tip, radicle minute.

PERAK. on low ground, under 500 ft in alt. *King's Collector* 938, 4723, 5949. MALACCA at Sungai Udang, *Goodenough* 1350.

To this species we also refer *Forbes'* No. 1124 from the Lampongs, Sumatra, but the leaves reach over 8 in. in length and 5 in. in breadth with slightly attenuate bases, and the fruiting calyx is rather more 2-lipped.

15. *PREMNA PYRAMIDATA*, Wall. Cat 1779 (1827). A small or medium-sized tree (a large tree—*Wallich*), reaching 40 to 50 ft. in height, and up to 5 ft. in girth; bark light greyish-brown; branches stout, pale brown; branchlets obscurely quadrangular, stellately tomentose with tawny tomentum. *Leaves* chartaceous; ovate, acuminate at apex, cordate or rounded sometimes attenuate at base, both surfaces brown when dry, the upper dark glabrous except on the nerves, the lower pale glabrescent, margins entire, 6 to 14 in. long, 3 to 8 in. broad; midrib stout, stellate-tomentose on both surfaces. main nerves 7 to 10 pairs, the lowest two pairs from near the base, the rest distant at an angle of about 60° with the midrib, curving gently upwards and joined by many regular transverse nervules very prominent on the under surface, petiole 1 to 4 in. long, channelled above, stellately scurfy-pubescent. *Cymes* in large terminal stellately-pubescent pyramidal panicles or corymbs, reaching 12 in in length, and 6 to 9 in in breadth, common peduncle 1 to 3 in. long, branches at first 3- afterwards 2-chotomous, usually ascending, bracts many, linear, reaching .5 in. long, flowers crowded at the ends of the branches on very short pedicels, greenish-white. *Calyx* campanulate, glabrous within, stellately-pubescent without, tube .075 in. long, teeth 5, subequal, about .025 in. long, the posterior three thickened, the two anterior shorter and more slender. *Corolla* bilabiate, .15 to .2 in. long, upper lip broad, lower lip 3-lobed, the midlobe the longest and spreading, the side lobes shorter and more obtuse, usually incurved, tube with a ring of retrorse stiff hairs at the throat, otherwise glabrous. *Stamens* 4, included, anther-cells elliptic, slightly divaricate, filaments stout. *Ovary* glabrous, depressed, style thickened with very shortly bifid stigma. *Drupe* globose or obovoid, glabrous, depressed at top, .2 to .25 in in diam., pericarp fleshy, pyrene rugose, very hard, 4-celled. *Seed* usually 1 only, oblong. Schauer in DC Prodr. XI 633, Miq Fl. Ind. Bat II 897, Hook f. Fl. Br Ind IV. 576. *P. tomentosa*, Kurz For. Fl. II. 260.

PERAK: *Wray* 3691, *Scortechini*, at Kwala Dipang, *Ridley* 9699, *King's Collector* 923, 2039, 2667, 6851, 10298. SELANGOR. *Ridley* 7596 —DISTRIB. Burma (*Wallich* 1779), Java (*Teysmann* 14), Timor (*Forbes* 3892). &c.

We have identified *Teysmann's* Java specimens as belonging to *P. pyramidata*, but we are not sure if *Koorders & Valetton* (*Bydr.* VII. 179) considered them to belong to their *P. tomentosa*, which, judging by *Koorders'* own specimens 9714  $\beta$  in the Calcutta Herbarium, is not *P. pyramidata*. We have, therefore, not quoted *Koorders & Valetton*. We agree with Sir D Brandis ('Indian Trees,' 511) in thinking that *P. bengalensis*, Clarke, is probably only a narrow-leaved form of *P. pyramidata*.

A specimen bearing Father Scoortechini's ticket but without number and without any note of locality, appears to be *Premna acuminata*, R Br Prod Nov Holl 512, Benth & Muell Fl Aust V 60, a North Australian species with long petioled, cordate ovate, deltoid, poplar like leaves, and very loose panicles. It may very likely have been collected in a Botanic Garden.

A specimen collected by R Derry at Bukit Borwang, Malacca, is too incomplete for identification. It may belong to *P leucostoma* Miq Fl Ind Bat II 899.

## 8 GMEIINA, Linn

Trees or shrubs, unarmed or armed with axillary divaricate spines (abortive branchlets). *Leaves* opposite, entire or more or less lobed. *Flowers* large, yellow or brownish yellow, often tomentose, in dense or lax sessile or pedunculate cymes along the branches of a terminal panicle, bracts usually small, sometimes large, leafy and coloured. *Calyx* campanulate, 4 to 5 toothed or subentire persistent and unaltered in fruit. *Corolla* obliquely campanulate or funnel shaped, tube slender below, much dilated above, limb spreading, oblique, 4 to 5-lobed. *Stamens* 4 didynamous, inserted below the throat of the corolla, included, anthers pendulous, with oblong sub separate cells. *Ovary* 4-celled, the cells 1 ovuled. style slender, stigma shortly 2 fid, ovules laterally attached to the septum at their middle or higher. *Fruit* a succulent drupe, endocarp bony, 2 to 4 celled, usually with a conical hollow in the middle open on one side. *Seeds* oblong, testa thin, with a corky layer outside. albumen none, cotyledons fleshy, radicle inferior. —*DISTRIB* Species about 11, in India, Malaya, China and Australia.

Leaves glaucescent beneath with minute glands, usually 3 or more lobed

1 *G asiatica*

Leaves fulvous tomentose beneath, rarely lobed

2 *G villosa*

*G Hystrix*, Schultes ex Kurz in Journ As Soc XXXIX ii 81 (1870) and I or Fl II 265 is a large spinous scandent shrub with very large coloured bracts a native of Siam and the Philippines also, according to Kurz, Tenasserim. It is probably only a garden escape in Singapore (Garden road, Ridley 3944).

1 *GMEIINA ASIATICA*, Linn Sp Pl 626 (1753). A much-branched spinous straggling shrub, bark yellowish white. branchlets horizontal, rigid, puberulous, the smaller ones often becoming spines at their ends. *Leaves* membranous, ovate or elliptic or obovate, often 3- or more lobed, the midlobe the longest, upper surface glabrous, lower surface glaucescent from a coating of minute round glands, and villous on the nerves, margins entire except for the 3 or sometimes more lobes which point upwards, 75 to 15 in long, 5 to 1 in broad, midrib slender, main nerves 2 to 3 pairs, reticulations few, petiole very

slender, up to 5 in long *Racemes* fulvous-tomentose, terminal, 1 to 2 in long, cymules very short, bracts small, caducous, pedicels very short flowers bright yellow *Calyx* 15 to 2 in long, tube with large flattened glands, otherwise pubescent, teeth 4, very small, triangular, acute *Corolla* 2 lipped, obliquely funnel shaped, puberulous without, nearly 2 in in length, tube slender below, gradually inflated above, lobes 4, ovate, more or less rounded, the lowest the longest *Stamens* curved, slightly exsert, filaments thickened, pubescent, anther-cells opening in a horseshoe, connective flattened, all 4 similar *Ovary* depressed, glabrous, style slender, exsert, stigma 2 lobed *Drupe* obovoid, yellow when ripe, 75 in long, pyrene pyriform with a basal cavity, bony *Seeds* usually 1 or 2 only, oblong at base, testa membranous with a corky covering albumen fleshy Roxb Fl Ind III 87 Lamk Ill t 542 Wall Cat 1818 (*in part*) Schauer in DC Prodr XI 679, Wight Ill t 174 Bedd Fl Sylv CXXXII, Brandis For Fl 365 Blume Bijdr 814 Miq Fl Ind Bat II 866, Clarke in Hook f Fl B<sub>1</sub> Ind IV 582, Trimen Fl Ceyl III 355, Cooke Bomb Fl II 425 Prain Beng Plants 829 *G. coromandeliana*, Burm Fl Ind 132 *G. lobata*, Gaertn Fruct I 268, t 56, *excl syn* Rumph *G. parvifolia*, Roxb Cor Pl II 32, t 162 Wall Cat 2654 Schauer, l c *G. parvifolia*, Roxb Fl Ind III 87 *G. inermis*, Blanco Fl Filip 493 *Michelia spinosa*, Amman in Act Petrop VIII 218, t 18

PERAK *Scortechini* SINGAPORE *T Anderson* 135, *Kurz Kunstler* 102 DISTRIB India (Deccan Peninsula), Ceylon, Java, Borneo, &c

2 GMFLINA VILLOSA Roxb Hort Beng 46 (1814) and Fl Ind III 86 (1832) A large straggling shrub or small tree with olive coloured bark, branches spreading and drooping branchlets round, villous, spines straight, axillary, 25 to 5 in long *Leaves* membranous when dry ovate trapeziform, acute at apex, cuneate at base upper surface pubescent when young, glabrous and dark coloured when old, lower surface fulvous tomentose margins entire or sometimes obscurely lobed, 1 to 4 in long 1 to 2.5 in broad midrib slender, raised beneath, main nerves pubescent above, 3 to 4 pairs, the lowest pair from just above the base transverse nervules slender, nearly horizontal, petiole slender, 75 to 1.5 in long, channelled above *Racemes* fulvous tomentose, 1 to 2 in long, cymules very short, bracts ovate lanceolate, cuspidate, about 5 in long, more or less leafy, deciduous when the flowers open, pedicels very short, flowers yellow *Calyx* 15 in long tube with 3 or more large glands on the under side, teeth 4, small, triangular, acute *Corolla*-tube slender below for nearly 5 in, then obliquely expanded for nearly 1 in, including the 4 lobes, the lowest of which is longest *Anthers*, especially of longer pair of stamens, with the connec-

tive enlarged behind *Style* slender, as long as the longer part of stamens, stigma 2-lobed, lobes unequal *Drupe* globose, yellow when ripe, fleshy, .75 in diam, pyrene pyriform, .5 in long, with a cavity opening on one side at the base, endocarp very hard, thick *Seeds* usually 1 to 2 only fertile, compressed, acute at the ends, cotyledons fleshy, obcordate, .25 in long, radicle very small Jack in Mal Misc I 17, and in Hook Bot Misc I 284, Wall Cat 1816, Schauer in DC. Prodr XI 679, Miq Fl Ind Bat II 867, Clarke in Hook f Fl Br Ind IV 582, Koord & Val Bijdr VII 198 *G. asiatica*, Wall Cat 1818 (in part), Kurz For Fl II 265 (not of Linn) *Gmelina*, sp n 2, Griff Notul IV 179 "*Radix deipara*," Rumph Herb Amb II 124, t 39

KEDAH Langkawi Island, *Curtis* PENANG Wallich 1816, *Phillips*, *G King*, *Curtis* 454 PERAK *Wray* 734, *Scortechini* 740 MALACCA *Griffith* 6057, *Mairguy* (K D) 1189 SINGAPORE *G Thomson*, *Kurz*, *T Anderson*, *Deschamps*, *Kunstler* 103 —DISTRIB Burma (*Kurz*), Nicobars (*Kurz*), Siam, Java, Sumatra (*Forbes* 1576, 2642)

#### 9 CLIFRODENDRON, Linn

Trees or shrubs, sometimes straggling or climbing *Leaves* opposite or rarely verticillate simple, entire or dentate or angularly-lobed *Flowers* small or large, of various colours, in axillary cymes or terminal panicles, often leafy below, bracts conspicuous or small, bracteoles 0 or very small *Calyx* campanulate, rarely tubular, truncate, 5-toothed or almost 5 partite, persistent, often accrescent, often coloured in fruit *Corolla* hypocrateriform or infundibular, tube usually long, slender, limb usually oblique, more or less 2 lipped, 5 lobed, the lobes spreading *Stamens* 4 didynamous, long exserted filaments filiform, involute in the bud, anthers ovate or oblong, more or less uniform, cells parallel, adherent above, separate below, filaments attached at the notch *Ovary* imperfectly 4 celled, the cells 1-ovuled, style filiform, stigma shortly bifid *Fruit* a globose, succulent or rarely dry drupe, 4-grooved or 4-lobed, separating into 4 pyrenes, of which 1 to 3 are sometimes suppressed, exocarp usually fleshy, endocarp bony or crustaceous *Seeds* oblong or pyriform, albumen 0, cotyledons thick, fleshy, radicle very small, inferior —DISTRIB 100 to 120 species, in the warm regions of both hemispheres, but chiefly in the eastern

*Corolla* hypocrateriform, the tube rarely more than 1 in in length (Subgenus 1 EUCLIFRODENDRON) —

*Cymes* axillary —

*Cymes* few flowered from most axils, leaves small, calyx teeth very short

1 *C. nervifolium*

- Cymes in deflexed pedunculate close panicles, from upper axis, leaves large calyx lobes linear lanceolate, over 2 in long 2 *C. deflexum*
- Cymes in leafy panicles, the lower branches appearing axillary —
- Leaves and inflorescence glabrous or only slightly puberulous, leaves usually over 1 in broad, long acuminate, membranous 3 *C. disparifolium*
- Leaves and inflorescence scabrous hispid more or less pubescent, leaves under 1 in broad, acute, chartaceous 4 *C. lankauensis*
- Cymes in terminal panicles —
- Leaves oblong or lanceolate —
- Panicles more or less pendulous, long pedunculate —
- Leaves 1 to 3 in broad, calyx lobes lanceolate, acute 5 *C. penduliflorum*
- Leaves 2 to 6 in broad, calyx lobes ovate cuspidate 6 *C. umbratic*
- Panicles erect short pedunculate or sessile —
- Leaves entire, calyx cleft nearly to the base, stems fistular —
- Leaves glabrous, main nerves distant, calyx lobes acuminate with incurved tips 7 *C. myrmecophilum*
- Leaves puberulous, main nerves rather close, calyx lobes acute glandular 8 *C. curtisi*
- Leaves serrate rarely entire, calyx truncate, teeth minute 9 *C. serratum*
- Leaves ovate, usually cordate at base — var *Hallii*
- Panicles pyramidal thyrsoid, leaves hairy —
- Corolla tube over 5 in long, leaf margins dentate 10 *C. infortunatum*
- Corolla tube under 3 in long leaf margins entire 11 *C. villosum*
- Panicles corymbose, leaves glabrous, corolla tube over 7 in long 12 *C. (Olebrookianum)*
- Leaves usually 3 to 7 lobed under surface prominently glandular 13 *C. paniculatum*
- Corolla infundibuliform the tube more than 1 in in length (Subgenus 2 SIPHONANTHUS) —
- Leaves usually verticillate, lanceolate, panicle very long many flowered, drupe blue 14 *C. Siphonanthus*
- Leaves opposite elliptic or ovate, panicle short few flowered, drupe red 15 *C. Ridleyi*

The following species are found in cultivation or as escapes from cultivation —

CLERODENDRON FRAGRANS, R Br in Ait Hort Kew ed 2, IV 63 (1812) A double flowered shrub with large leaves of unpleasant odour, the flowers white merging into dark purple and fragrant — SINGAPORE Deschamps, King's Collector 304

C CALAMITOSUM, Linn Mant 90 (1767) A slender white-flowered shrub, native of Java and often found in gardens In the Fl Br Ind it has been described as a Malacca species on the authority of Maingay's specimen, but Mr Ridley informs us that in his opinion the plant is not indigenous and that Maingay's specimen came, in all probability from a garden escape

C THOMSONÆ, Balf f in Trans Bot Soc Edinb VII 265, t 7, and 580, t 16 (1863) A climbing shrub, native of Tropical Africa, with opposite ovate leaves and terminal lax cymes of flowers with a white calyx and crimson corolla —PENANG Curtis 124 SINGAPORE Deschamps

C SQUAMATUM, Vahl Symb II 74 (1791) An erect shrub, native of India, China, and Sumatra, with ovate cordate leaves and scarlet flowers in large panicles —SINGAPORE Ridley 9209

1 CLEODENDRON NERIIFOLIUM, Wall Cat 1789 (1828) A straggling shrub, branches ashy grey, lenticellate, branchlets slender, greyish brown Leaves membranous, ternate or opposite, elliptic, acute or rounded often slightly emarginate at apex, shortly attenuate at base, glabrous or, when young, sparsely pubescent on both surfaces, margins entire, 1.5 to 3.5 in long, .75 to 1.75 in broad, midrib slender, main nerves about 5 pairs, straight or branched to meet in an obscure looped intramarginal nerve, reticulations finely netted, petiole slender, .25 to .5 in long Cymes axillary, umbellate, sometimes in a 7 flowered dichasium, often only 3 flowered, peduncle 1 to 1.5 in long, bracts linear, setaceous, bracteoles similar but smaller, pedicels .15 to .25 in long flowers white, purplish-pink (Forbes) Calyx tube 5-mercampanulate, enlarged in fruit and then cup shaped, tube 1.5 in long, pubescent and gland-dotted without, teeth 5, minute Corolla tube very slender, .75 to 1 in long, gland dotted without, villous within, lobes 5, spreading, unequal, somewhat oblong, about .25 in long Stamens red, long-exserted, anther cells oblong, parallel Ovary cylindric, obtuse, style very slender, stigma shortly bifid Drupe obovoid, .5 in long, .4 in in diameter, top depressed, exocarp spongy, pyrenes 4 readily separating, endocarp crustaceous Seed obovoid, testa thin cotyledons oblong, thick, fleshy, radicle very short, thick Schauer in DC Prodr XI 660, Miq Fl Ind Bat II 839, Clarke in Hook f Fl Br Ind IV 589 Plain Beng Plants 835 C merme, Benth Fl Hongk 271, and Fl Austral V 61, Schauer l c (in part), Wall Cat 1788, Sheet 1 on A C merme var nerifolia, Kurz For Fl II 266 Volkameria nerifolia, Roxb Fl Ind III 64 "Jasminum litoreum," Rumph Herb Amb V t 46

KEDAH in Langkawi Island, Curtis (Hamad) PENANG at Batu Ferengy, Curtis 2782, (or SINGAPORE), Wallich 1788, 1 PERAK at



Krian, *Scortechini* 1382 MALACCA *Griffith* (K D.) 6056, 1, on swampy ground near the sea, *Maingay* (K D.) 1188. JOHORE *G King*. SINGAPORE *Kunstler* 59, *Hullett* 143, seashore, *Deschamps* — **DISTRIB.** India (Chittagong at Mascal Island), Burma (Arracan and Tenasserim coasts), Sumatra (*Forbes* 1802), Borneo (*Haviland* 1018, 3555), Siam, Philippine Islands, China, Australia, Polynesia

A coast plant, similar to *C. inerme*, Gaertn., of the coasts of India, and considered by some to be a variety of it. It is distinguished by the leaves of different shape and texture, the smaller and more slender and glandular corolla, and the larger drupe. The leaves are sometimes lanceolate (see Roxb. Ic. No. 2524)

2 CLERODENDRON DIFLEXUM, Wall Pl As Rar III 10, t 215 (1832), and Cat 1808. A shrub, reaching in height 4 ft (*Wallach*), 4 to 6 ft (*Kunstler*) branches obscurely quadrangular, furrowed, pubescent, pale brown. *Leaves* opposite, membranous when dry, variable in shape, elliptic oblong-obovate or oblanceolate, cuspidate-acuminate at apex, rounded or cuneate at base, upper surface slightly pubescent when young, afterwards glabrous except on the nerves, lower surface softly pubescent, at length glabrate, margins entire or slightly undulate repand, 6 to 16 in long, 2 to 6 in broad, midrib strong, prominent beneath, pubescent, main nerves 10 to 16 pairs, prominent beneath, the lowest pair from the base at an acute angle, the rest curving upwards to and along the margin, transverse nervules rather regular and conspicuous in old leaves. *reticulations* netted, petiole 1 to 2.5 in long, pubescent, swollen above and below, channelled on the upper side. *Panicles* corymbose, axillary in the ultimate or penultimate axils of the branches, usually deflexed at right angles to the branch, peduncles 1 to 8 in long, with 1 or 2 pairs of bracts like small leaves along them, bracts of the inflorescence lanceolate, corymbs crowded with single flowers or short trichotomous cymes, very many-flowered, bracteoles many, linear, peduncles, bracts, branches and calyx all red when fresh. *Buds* clavate, flowers white tinged with pink. *Calyx* tube very short, scarcely 1 in long, lobes linear-lanceolate, erect, pubescent, 2 to 3 in long, fruiting calyx enlarged and stellately spreading. *Corolla*-tube very slender, 5 to 7.5 in long, glabrous, lobes subequal, spreading, spatulate, up to 2.5 in long. *Stamens* long exsert, filaments very slender, glabrous, anthers oblong, cells parallel. *Ovary* rounded, obtuse, style very slender, stigmatic branches short. *Drupe* purple, globose, depressed, smooth, with 4 or fewer pyrenes, pyrenes pyriform, 3.5 in long, 2.5 in broad, endocarp crustaceous, reticulate, seeds conform to the pyrenes, testa membranous,

cotyledons unequal, fleshy, radicle very small Schauer in DC Prodr XI. 665, Miq Fl Ind Bat II 875, Clarke in Hook. f Fl. Br. Ind. IV 593

PFNANG Porter (Wallach 1808A), Curtis 81 PERAK at Gunong Ijuk, &c, *Scortechini* 433, 1230, at Tapa, Waterfall, Maxwell's Hill, &c, *Wren* 1359, 1414, 2661, 3231, 4203, at Goping, Bukit Bingarung, &c, *King's Collector (Kunstler)* 168, 307, 1875, 6818 MALACCA *Cunning* 2368, *Griffith*, *Maingay* (K D) 1185, *Hullett* 404, at St John's Hill, *Hervey*, at Ayer Punas, *Derry* 296 JOHORE *G King* SINGAPORE *Wallach* (cf Pl As Rar), *Walker* 257, 288, *G King*

3 *CLERODENDRON DISPARIFOLIUM*, Blume Bijdr 809 (1826) A shrub or small tree, reaching sometimes 20 ft or more in height, branches pale brown, lenticellate, obscurely quadrangular, branchlets similar, slender puberulous *Leaves* membranous, the pairs more usually equal but occasionally unequal in size, oblong or elliptic lanceolate, long acuminate at apex, acuminate or acute occasionally almost rounded at base glabrous and pale on both surfaces except sometimes on the midrib beneath, margins entire or undulate, or obscurely toothed, variable in size as in shape, 2 to 7 in long, 75 to 25 in broad midrib slender, main nerves 5 to 7 pairs, the lowest from close above the base and at about 20° to 30° with the midrib, the rest distant, starting at 50° to 60° with the midrib and curving upwards to near the margin, the upper ones joining in an intramarginal looped nerve reticulations distant, transverse, not prominent, petiole slender, variable, 5 to 25 in long, often twisted at base *Cymes* puberulous, in lax spreading terminal or axillary brachiate panicles, the branches slender, repeatedly trichotomous, terminal ones sometimes up to 6 in long, axillary ones about 2 to 3 in long, peduncles very slender bracts linear, usually about 25 in long, those of main branches sometimes leafy, caducous after flowering pedicels filiform, 25 to 5 in long buds clavate, flowers pale yellow *Calyx* reddish, tube campanulate, about 1 in long, lobes as long as tube, triangular, acute, prominently nerved, the calyx enlarged in fruit to about 5 in long, with dark red reflexed lobes *Corolla*-tube slender, 5 to 75 in long, glabrous without, puberulous within, lobes 5, subequal, spatulate, 2 to 25 in long *Stamens* exsert *Ovary* glabrous, style as long as stamens, stigma shortly bifid *Drupe* globose, succulent, 25 in in diameter *Seeds* usually 2 fertile, ovoid, testa thin, wrinkled, cotyledons thick, fleshy, radicle minute Schauer in DC Prodr XI 672, Hassk Retzia 1, 57, Miq Fl Ind Bat II 871, Clarke in Hook f Fl Br Ind IV 589, Koord & Val Bijdr VII 212 *C acuminatum*, Wall Cat 1792, Schauer l c 662, Miq l c 869 *C Jackianum*, Wall Cat 1794, and in Hook Bot Misc I 284

(note to *C nutans*, Jack), Bot Mag t 3049 (in note), Schauer l c, 664, Miq l c 872

KEDAH at Pulau Songsong, *Curtis* PENANG at Penara Bukit, *Curtis* 1539 PERAK *Wray* 1352, 2841, *Curtis* 2043, 3196, 3333, *King's Collector* 751, 879, 2301, 4130, 4331, 4332, 5197?, 8772, *Scortechini* 297, 314, 922 DINDINGS Pangkore, *Scortechini* 1011, *Curtis* 1638 SELANGOR *Curtis* 3778 MALACCA *Griffith*, *Harvey* *Cunang* 2378, 2395, *Ridley* 378 Derry 414, *Holmberg* 810, *Gooenough* 1773 JOHORE *Cantley* 19 SINGAPORE *Wallich* 1792 c *Lobb*, *Ridley*, *G King*, *Mamgay* (K D) 1186, *Deschamps*; *Murt* 93, *Walker* 54, *Kunstler* 1, 119 — DISTRIB Malay Archipelago

4 CLERODENDRON LANKAWIENSE, King & Gamble in Kew Bull 110 (1908) A shrub, branchlets scabrid puberulous, obtusely quadrangular, channelled *Leaves* chartaceous, opposite, oblong lanceolate or oblanceolate, acute at apex, attenuate at base, both surfaces sparsely glabrous-hispid, pubescent on the nerves beneath, margins entire, 3 to 4 in long, 5 to 1 in broad, midrib stout, main nerves 8 to 10 pairs, curving acutely upwards to and along the margin, transverse nervules few, irregular, reticulations netted, petiole 25 in long, scabrid pubescent *Panicle* leafy, terminal, pyramidal, thyrsoid, reaching 10 in in length and 4 in in diam, scabrid pubescent, branches at about 1 in intervals, pedunculate, ending in rather few flowered trichotomous cymes bracts leaf like, lanceolate, bracteoles small, setaceous, pedicels slender, about 2 in long, buds clavate up to 75 in long *Calyx* campanulate, scabrous hispid without, glabrous and with large peltate glands within, cleft about two thirds down prominently nerved, lobes ovate acute, 2 to 25 in long, 1 in broad at base *Corolla* tube slender, pubescent, cylindric, 5 in long, lobes spreading, obovate, the midlobe of the lower lip longer than the rest *Stamens* long-exsert, filaments very slender, glabrous, anthers oblong, 0.75 in long, cells parallel *Ovary* rounded, obtuse style very slender, stigmatic lobes very short *Fruit* not seen

KEDAH at Terutau on Langkawi Island, *Curtis* 3789

Only one specimen of this species is available It is near *C Griffithianum*, Clarke, but differs in the inflorescence calyx, &c

5 CLERODENDRON PENDULIFLORUM, Wall Cat 1795 (1828) A shrub, branchlets pale-brown, pubescent, quadrangular *Leaves* membranous, opposite or ternate, ovate or lanceolate or oblong lanceolate, long acuminate at apex, acute at base, glabrous on both surfaces, glaucescent on the lower, margins entire or sometimes crenulate, 5 to 8 in long, 1 to 3 in broad, midrib slender, main nerves 5 to 7

pairs, distant, at once curving upwards to and along the margin, reticulations distant, obscure, petiole 5 to 2 in long, slender, channelled *Panicle* elongate, very lax, usually pendulous, glabrous or puberulous, long pedunculate, reaching about 15 in in length and up to 4 in in greatest diameter branches distant, opposite, bearing few flowered umbellate cymes on slender peduncles 5 to 1 in long bracts linear subulate, 15 to 2 in long pedicels slender, 1 to 15 in long flowers white, the rachis and calyx red *Calyx* glabrous, deeply lobed, tube 1 in long lobes oblong lanceolate, acute, 3 in long somewhat enlarged, reddish and reflexed in fruit *Corolla* tube funnel shaped, curved, slender 5 in long, slightly glandular pubescent lobes oblong spatulate, rounded, the 2 lower slightly emarginate, about as long as the tube *Stamens* exsert anther cells incurved so as slightly to overlap *Ovary* bicentric, truncate style slender stigma shortly 2 fid *Drupa* fleshy globose, 25 to 35 in in diam pyrenes 4 thin walled *Seed* usually one only, testa membranous rugose cotyledons thick fleshy Schauer in DC Prodr XI 664 Clarke in Hook f Fl Br Ind IV 591 Bot Mag t 3049 (*in note*)

PENANG at Penang Bukit and base of Penang Hill Ridley 6947, 7181 Curtis Deschamps PERAK at Batu Kurin Scottcham 1612 SLLANGOR Caves, Gua Batu, Ridley 8212 — DISTRIBUTION Burma (Mracon (Kurz), Tenasserim (Helfer (K D) 6047) Tenos (Wallach 1795)), Nicobar Islands

6 CLEODENDRON UMBRAILE, King & Gamble in Kew Bull 110 (1908) A shrub or small tree reaching 8 to 15 ft in height branchlets pale brown, smooth, fistular *Leaves* membranous variable in shape usually oblong or obovate or oblanceolate the broadest part about two thirds up or even higher long and rather suddenly acuminate at apex, usually rounded but sometimes attenuate at base glabrous on both surfaces entire, 8 to 16 in long, 2 to 6 in broad midrib rather slender, main nerves 8 to 12 pairs, slender, the lowest pair usually from the base at an acute angle with the midrib, the rest at a wider angle curving upwards, the upper ones joining in a looped intramarginal nerve, transverse nervules irregular reticulations netted petiole 1 to 3 in long, flaccid *Panicles* from the uppermost axils, elongate, lax, somewhat curving, glabrous, usually 4 to 6 in long and about 3 in broad, on slender peduncles 4 to 7 in long branches divaricate, usually at right angles, with few flowered cymes rachis flattened and slightly winged, bracts leafy, lanceolate, up to 1 in long, bracteoles many, linear setaceous, pedicels slender, puberulous, 1 to 5 in long, buds spatulate, curved, 1 in long flowers rather large, white tinged with pink, the calyx white or pale green turning red in fruit *Calyx* large glo

bosc or slightly puberulous, deeply divided nearly to the base, lobes ovate acuminate, cuspidate, about 6 in long by 25 in broad, enlarging in fruit to 15 in in diam, and then spreading *Corolla*-tube slender, cylindric, 4 to 6 in long, lobes spatulate, rounded at top, as long as tube *Stamens* exsert, filaments glabrous, anthers 1 in long, cells parallel *Ovary* rounded, obtuse, style very slender, stigmas 2, short *Drupe* black, smooth, fleshy, globose, 5 in in diam, pyrenes 4 or less, triangular-convex, endocarp crustaceous *Seeds* rounded, 25 in in diam, testa membranous, cotyledons fleshy, radicle minute

PERAK at Kapayong Kinta, Wray 167, in dense jungle up to 3500 ft, King's Collector 722, 6959, 8268, *Scortechini* 2198, on Larut Hills, 3000 ft, and in Taiping Hills, Derry 3704 (Curtis), 10712, at Kwala Dipang, Curtis 3116, at Bujong Malacca, Ridley 9700 — DISTRIB Sumatra (in deep shade of forest at Gienoeng Trang and Kotta Djawa, Lampongs, Forbes 1333, 1585)

Ridley's No 7594 from Ginting Bidai Selangor appears to be this species but the leaves are rather narrower than usual and reach 12 in long by 25 in broad the specimen is in fruit, which Ridley describes as black with a red calyx

7 *CLLRODENDRON MYRMECOPHILUM*, Ridley in Journ Bot XXXIII 42 (1895) A sparingly branched shrub, about 3 ft high, stem stout, terete, glabrous, fistular, the bark white, internodes swollen hollow *Leaves* opposite or alternate, membranous when dry oblong, elliptic-oblong or -oblanceolate, acute or obtuse at apex, acute obtuse or cordate at base both surfaces glabrous, dull, margins entire, 6 to 12 in long, 2 to 4 in broad, midrib stout, broad, pale on the upper surface main nerves 10 to 13 pairs, curving very gently upwards to meet in a looped intramarginal nerve, transverse nervules very few, irregular, reticulations not visible, petiole 75 to 25 in long, fistular *Panicle* a terminal, shortly peduncled, pubescent, pyramidal thyrsus reaching 10 in long and 3 to 4 in broad, branches usually opposite, spreading, of rather few flowered loose reddish brown cymes, bracts and bracteoles linear subulate, caducous reddish-brown, pedicels 15 to 2 in long, buds clavate, curved, flowers ochreous red *Calyx* puberulous, about 3 in long, cleft nearly to the base, lobes erect, lanceolate acuminate with incurved tips, fruiting calyx enlarged to about 1 in in diam, lobes triangular acuminate, reflexed, red *Corolla* tube cylindric, about 5 in long, puberulous without, lobes as long as tube, obovate oblong, the tips rounded *Stamens* long exsert, filaments very slender, red, anthers oblong-reniform, 05 in long, cells parallel *Ovary* glabrous, obtuse, style as long as stamens, red, stigmatic branches slender *Drupe*

globose, black, 5 in in diam, with 4 to 1 pyrenes, pyrenes convex on back, nearly plane on the face, 3-ribbed, 3 to 4 in long. Seed conform with the pyrenes, testa membranous, cotyledons thick, fleshy, unequal, radicle minute. Bot Mag t 7887, Gard Chron XXXIII Ser 3, 196 (1903), and XXXV Ser 3, 237, t 98 (1904)

JOHORE at Jaffaria, *G King* SINGAPORE in dense wet woods at Choa Chu kang, Ridley

The hollow stems are swollen at the internodes and there form nests for ants belonging to the genus *Pheidole*, Fabricius. The same phenomenon occurs in *C fistulosum*, Becc., of Borneo, in *C formicarum* Gurke, a native of Tropical Africa (Hook f in Bot Mag t c), and in the next species here described

8 CLERODENDRON CURTISII, H. H. W. Pearson in Kew Bull 142 (1901)  
A small shrub, usually 2 to 3 ft, sometimes reaching 6 ft high. Stem thick, fistular, striate, minutely puberulous. Leaves opposite, membranous, elliptic, elliptic-oblong or obovate, acuminate at apex, broadly cuneate rounded or sometimes slightly cordate at base, both surfaces somewhat puberulous, upper glabrescent when old. Margins entire or undulate denticulate. 4 to 12 in long, 3 to 6 in broad. Midrib stout, pubescent, main nerves 9 to 12 pairs, curving upwards to and along the margin where they anastomose. Transverse nervules fairly regular and prominent, reticulations inconspicuous. Petiole thick, striate, puberulous, 1 to 1.5 in long. Panicles terminal, thyrsoid, pubescent much-branched, reaching 6 to 8 in long and 4 to 5 in broad, the rachis and branches angular. Branches opposite, with peduncles .75 to 1 in long and corymbose cymes of many flowers, bracts leafy, the lower large, the upper obovoid or spatulate, bracteoles small, subulate. Pedicels slender 1.5 in long, buds clavate, 5 to 7.5 in long, flowers bright yellow, tinged with red, the calyx crimson. Calyx cleft three quarters down, lobes lanceolate, acute, 3 nerved, pubescent ciliate, .25 in long, 1 in broad, with usually several rather obscure peltate glands. Corolla tube cylindric, slender, 5 to 7 in long, puberulous, glandular, lobes obovate or elliptic, narrow at the base, 2 to 3 in long. Stamens long exsert, filaments glabrous, anthers reniform, under .05 in long, cells parallel. Ovary glabrous, obtuse, style very slender, stigmatic branches short. Drupe not seen.

PERAK at Kota, Wray 3246, Lampjibus, Scottchinn 1555, on Larut Hills, 3000 ft, Lerry (Curtis) 3704, in low swampy places at Larut, King's Collector (Kunstler) 1966, 2507. DINDINGS Bruas, in damp places, Curtis 3441. SILLANGOR Klang, Ridley 10198.

Mr Ridley informs us that this is the same plant as *Clerodendron breviflorum* Ridley in Journ Bot XXXII 43 (1895), which was described from specimens

collected at Kampong Chin Chin, Ula Batu Pahat, Johore, by Lake & Kelsall in 1892. Unfortunately, there are no specimens in the herbaria at Kew or Calcutta, so we hesitate to alter the name. If the identification proves correct, it is Ridley's name that must take precedence. This is one of the species whose fistular stems contain ants' nests. *C. macrophyllum*, Hook MS in Herb Kew, a large leaved, handsome species from Java and Borneo is very closely allied to this species.

9 *CLERODENDRON SERRATUM*, Spreng Syst Veg II 758 (1825), Don Prodr Fl Nep 103, Wall Cat 1809, Ham in Trans Linn Soc XVII 187, Schauer in DC Prodr XI 664, Dalz & Gibs Bomb Fl. 200, Wight Ic t 1472, Brandis For Fl 364, Kurz For Fl II 267, Blume Bijdr 810, Miq Fl Ind Bat II 873. Clarke in Hook f Fl Br Ind IV 592, Trimen Fl Ceyl III 360, Cooke Fl Bomb II 432, Prain Beng Plants 835. *C. ternstroemii*, Don l c. *C. macrophyllum*, Sims Bot Mag t 2536, Reich Fl Exot t 209, Schauer l c 674. *C. ornatum*, Wall Cat 1811, Schauer l c 675. *C. herbaceum*, Wall Cat 1815, Schauer l c 675. *Volkameria serrata*, Linn Mant 90, Roxb Fl Ind III 62. *V. herbacea*, Roxb Hort Beng 46.—DISTRIB India, Burma, and Ceylon.

VAR *Wallichii*, C B Clarke in Hook f Fl Br Ind IV 592. A shrub, reaching 8 to 10 ft in height (*Kunstler*), branches somewhat herbaceous, smooth, fistular, branchlets smooth, angled and with raised lines decurrent from the nodes. *Leaves* opposite, almost membranous when dry, obovate lanceolate or oblanceolate, shortly acuminate at apex, acuminate narrowed at base, both surfaces glabrous, margins distantly serrate or denticulate, sometimes entire, 4 to 8 in long, 1.5 to 3 in broad, midrib strong, prominent beneath, main nerves 6 to 10 pairs, at first straight, then curving upwards to and along the margin, reticulations irregular, petiole up to about 6 in long or none when bordered by the decurrent margins of the blade. *Panicle* terminal, erect, elongate, minutely pubescent, reaching 10 to 12 in in length and 2 to 2.5 in in breadth, the branches many, divaricate, subdichotomous, many flowered. *Bracts* foliaceous, large, ovate or obovate, acuminate or obtuse and apiculate, bracteoles many, lanceolate or finally linear. *Pedicels* slender, about 1 in long, buds spatulate, curved, flowers greyish-white to blue, the lower lobe darker than the rest. *Calyx* campanulate, lobes extremely short, rounded, minutely apiculate, the fruiting calyx cup-shaped, almost truncate, not enlarged. *Corolla*-tube cylindric, slightly narrowed below the oblique throat, 2 to 2.5 in long, glabrous without, villous within, lips 2, upper of 2 oblong, flat, obtuse lobes, lower of 3 lobes, the side ones similar to the upper, the midlobe spatulate, concave, emarginate, all about 2.5 in long. *Stamens* very long-exsert, much curved, filaments villous at the base and

thickened, anthers oblong, 0.75 in long, cells parallel. *Ovary* glabrous, truncate at top, style very long, slender, stigmas 2, rather long. *Drupe* purple, succulent, when dry 2.5 in long, and as much broad at top, with 4 (or less) well-marked pyrenes, pyrenes obovoid, plane or concave on inner faces, endocarp crustaceous. *Seeds* obovoid, 1.5 to 2 in long, concave on the inner, convex on the outer face, which is wrinkled, testa thin, cotyledons fleshy, unequal, one convex, the other concave, radicle minute. *C. farinosum*, Wall Cat 1810 (not *Volkameria farinosa*, Roxb.) *C. divaricatum*, Jack in Mal Misc I 2, and in Hook Bot Misc II 89, Schauer in DC Prodr XI 674.

PLAK *Wray* 1871, at Ipoh, *Curtis* 3198, 3328 at Ipoh and Baton Gajah, *Deschamps*, near Taiping, *Scortechini* 507 at Gopeng, *King's Collector (Kunstler)* 480. SILLANGOR *Goodenough* 10478. *Cecil C. Smith*. — DI-TRIB India (Sikkim, Assam and Burma), Sumatra, Java, Celebes, Cambodia.

We have not followed Clarke in quoting *C. javanicum* Walp Rep IV 118, as we consider the description therein given does not sufficiently fit our specimens.

10 *CLERODENDRON INOBRUNATUM*, Linn Sp Pl 637 (1753). A shrub, usually about 3 to 8 ft high, occasionally a small tree, gregarious, branchlets obtusely quadrangular, slightly furrowed, clothed with yellowish pubescence. *Leaves* somewhat coriaceous, ovate, acuminate at apex, rounded or cordate at base, both surfaces roughly strigosely hairy, lower sometimes with small obscure round glands, margins dentate or denticulate, rarely entire, 4 to 10 in long, 3 to 8 in broad, midrib prominent, main nerves also prominent, about 8 pairs, the lowest two pairs near the base spreading, the rest gradually curving upwards, all joined by prominent transverse nervules which branch and anastomose, reticulations netted, petiole 1 to 4 in long, densely pubescent. *Panicle* terminal, pyramidal, spreading, 6 to 12 in long and broad, densely tawny pubescent, the branches trichotomous, ending in many flowered cymes, bracts leafy, ovate-lanceolate, deciduous, bracteoles lanceolate, also deciduous, pedicels slender, 2.5 to 5 in long, buds clavate, rounded at top, flowers white, tinged with pink, the calyx red at the base (Ic. Roxb.). *Calyx* cleft nearly to the base, silky pubescent, often with scattered, large, round, peltate glands, the lobes lanceolate, acute, suberect, 3 to 4 in long, fruiting calyx enlarged, crimson, reaching 1.5 in in diam when spread out. *Corolla* densely pubescent without, tube cylindric, slender, 5 to 7.5 in long, lobes spreading, as long as the tube, the 2 upper somewhat spatulate, the 3 lower ovate, oblong, rounded. *Stamens* long-exsert, filaments glabrous, anthers oblong, the cells parallel. *Ovary* rounded, glabrous,



style slender, stigmas 2, short *Drupe* nearly globose, shining, black, 3 in in diam, with 4 to 1 pyrenes, pyrenes convex without, the endocarp crustaceous *Seeds* conform to the drupe, testa membranous, cotyledons fleshy Gaertn Fruct I 271, t 57, fig 1, Lamk III t 544, Wall Cat 1796, Schauer in DC Prodr XI 667, Dalz & Gibs Bomb Fl 200, Wight Ic t 1471 (?), Bedd Fl Sylv CLXXIII, and Anal XXII fig 1, Brandis For Fl 363, Kurz For Fl II 267, Miq Fl Ind Bat II 876, Trimen Fl Ceyl III 361, Clarke in Hook f, Fl Br Ind IV 594, Cooke Fl Bomb II 432, Prain Beng Plants 835 *C viscosum*, Vent Jard Malm t 25, Bot Mag t 1805, Bot Reg t 629 *C cordatum*, Don Prodr Fl Nep 103, Schauer l c 674 *Volkameria infortunata*, Roxb Fl Ind III 59 *Clerodendron*, Linn. Fl Zeyl 232, Burm Thes Zeyl 66

SIAMESE SIAMIS Poongah, Curtis 2949 SINGAPORE Schomburgk 106 —DISTRIB India, Burma, Ceylon, Java, Moluccas

We have not quoted "*Peragu*", Rheede Hort Mal II t 25, which Clarke & Miquel consider to be this species. Schauer quotes it under *C villosum*, and it seems to us to resemble that species more closely in the leaves and calyx. *C villosum* has not hitherto been recorded from the Western Peninsula, but Gamble has specimens collected in the Wynnad region of the Nilgiris which seem to be it and not *C infortunatum*. We do not feel very sure that the plant figured in Wight Ic t 1471 is not *C villosum* rather than *C infortunatum*.

11 CLERODENDRON VILLOSUM Blume Bijch 811 (1826). A shrub, usually about 3 to 5 ft high (10 to 15 ft, *King's Collector*, 15 to 20 ft, *Kurz*) branchlets stout, obtusely quadrangular, densely tawny villous, channelled on the sides. *Leaves* chartaceo coriaceous, ovate acuminate at apex, cordate or truncate at base, sometimes slightly cuneate, both surfaces tawny villous or velvety tomentose, those of young leaves white silky, margins entire 4 to 8 in long, 3 to 5 in broad, midrib stout, prominent, main nerves 5 to 6 pairs, the lowest pair from the base spreading at right angles to the midrib with about 8 to 10 nerves from the lower side, the next pair from close above it curving upwards with also about 8 to 10 nerves from the lower side, the rest more distant and similarly curving, transverse nervules distant, pale, reticulations obscure, petiole 2 to 6 in long, densely tawny pubescent. *Panicle* terminal, pyramidal, thyrsoid, spreading, reaching 4 to 7 in long and 6 in broad, densely tawny pubescent, branches long peduncled, ending in trichotomous cymes of rather few flowers, bracts leafy, ovate lanceolate, acuminate, persistent, bracteoles many, small, lanceolate, deciduous, pedicels 1 to 2 in long, buds short, clavate, rounded, flowers white or cream-coloured, tinged with red. *Calyx* cleft about

two thirds down, with large prominent, scattered, rounded glands lobes ovate-lanceolate, cuspidate-acuminate, 25 in long, fruiting calyx white, much enlarged, nearly 1 in in diam when opened, completely embracing the fruit. *Corolla* villous tube cylindric, 2 to 3 in long, lobes obovate oblong, as long as tube. *Stamens* long exserted filaments slender, anthers oblong reniform cells parallel. *Ovary* glabrous obtuse, style slender, longer than the stamens, stigmatic lobes 2 very short. *Drupe* globose, shining, black when ripe (*King's Collector*), white (*Jack*), slightly succulent with 4 to 1 pyrenes pyrenes convex on the outer, flattened on the two inner, faces, 25 in long, endocarp crustaceous, reticulate. *Seed* oblong, curved 15 to 2 in long, testa thin cotyledons fleshy, curved, somewhat unequal radicle minute. *Schauert* in DC Prodr XI 667. *Kurz* For Fl II 268. *Miq* Fl Ind Bat II 877, *Clarke* in Hook f Fl Br Ind IV 595 (*molle*, *Jack* in Mal Misc I 15 and in Hook Bot Misc I 283 (not of H B K). *C. velutinum*, Wall Cat 1797. *C. trichotomum*, Wall Cat 6315 B (not of Thunb.)

PIRANG. *Curtis* 101 roadsides on the hill, *Deschamps*, near top of the hill, *G. King*. PERAK. *Scortechini* 1389 in open forests, at 100 to 300 ft alt, *King's Collector* (*Kunstler*) 5191, 5647, 8831. DINDINGS. Pangkore, *Scortechini* 63. MALACCA. *Griffith* 6051. *Mamgay* (K D) 1187. *Hervey*, *Derry* 148. SINGAPORE. *Cunamy* 2415, *Wallich* 1797. *Morton* 124. *Schomburgk* 66, *Kurz*, *G. King*, *Deschamps*. —DISTRIB. Burma (Maitaban, vide *Kurz* Meigu, *Griffith*), Java, Sumatra, Philippines.

12. *CLERODENDRON COIFFERBROOKIANUM*, Walp. Rep IV 114 (1814). A large shrub, sometimes a small tree with silver grey bark branchlets glabrous or the uppermost pubescent quadrangular, furrowed below the leaf petioles, more or less fleshy and soft innovations tawny pubescent. *Leaves* membranous when dry, opposite, broadly ovate, acute at apex, cordate at base, the sinus rather broad, both surfaces glabrous except the nerves beneath which are puberulous, a few large glands on the lower surface especially near the apex of the petiole, margins entire or sinuate 5 to 12 in long, 4 to 10 in broad midrib prominent, main nerves 8 to 10 pairs, the lowest pair from just above the petiole, with about 5 to 6 branch nerves on the outer side, all spreading and curving only close to the margin, transverse nerves faint, as are the netted reticulations, petiole 2 to 8 in long, cylindric, smooth. *Panicles* large, spreading, terminal, pubescent, reaching 1 to 2 ft in diam, branches long peduncled, ending in corymbose, close, many-flowered cymes, bracts lanceolate, caducous, bracteoles many, lanceolate, pedicels short, 1 to 2 in long, buds clavate, often 1 in

long, flowers white to rose-purple *Calyx* pubescent, 15 to 25 in long, cleft half-way down, tube with often a large gland under each lobe, lobes triangular-lanceolate, acute, fruiting calyx scarcely enlarged *Corolla*-tube cylindric, slender, nearly glabrous, 75 to 1 in long, lobes elliptic or obovate, 25 in long *Stamens* long-exsert, filaments glabrous, anthers oblong-reniform, 0.75 in long, cells parallel. *Ovary* glabrous, obtuse, style very long and slender, stigmatic lobes 2, short *Drupe* glabrous, blue, 3 to 3.5 in in diam with usually 4 pyrenes Schauer in DC Prodr XI 672, Clarke in Hook f Fl Br Ind. IV 594 *C. glandulosum*, Colebr MS ex Wall Cat 1806, *vide* Walp, Lindl in Bot Reg t 19 (1844) in note, Schauer l c

SINGAPORE *Lobb*—DISTRIB India (Sikkim, Assam, Burma) It is not quite certain that it is really indigenous in the Peninsula, *Lobb* s specimen may have been from a cultivated plant

VAR *Forbesii*, King & Gamble Leaves and branchlets puberulous, panicles reduced to a terminal corymb of closely packed flowers 4 to 5 in long, no glands on calyx or midrib of leaf, flowers dark scarlet

Sumatra (near Kagoengan Ratoe, Lampongs, at 500 ft alt, *Forbes* 1786)

13 CLERODENDRON PANICULATUM, Linn Mant 90 (1771) A shrub, reaching 4 to 6 ft in height, branchlets quadrangular, channelled below the leaf petioles, glabrous or puberulous, the bases of the leaves (as also the branches of the inflorescence) joined at the nodes by a belt of soft brown hairs *Leaves* membranous, variable in shape, usually orbicular or ovate, from almost simple to deeply 3- to 7 lobed, cordate or hastate at base, acuminate at apex and at the apices of the lobes, upper surface sparsely hispid or glabrescent, lower pale and densely covered with round peltate glands, margins entire or minutely denticulate, 4 to 8 in in diam, midrib stout, ribs usually 3 pairs radiating from the base, the lower deflexed, main nerves of middle lobe 5 to 6 pairs, of side lobes about the same but stronger on the lower side, reticulations slender, netted, petiole variable, 1 to 6 in or more *Panicles* terminal, thyrsoid, pyramidal, spreading, 4 to 12 in long by 3 to 8 in broad, with opposite branches bearing trichotomous cymes with racemose reddish branches, the rachises channelled, bracts foliaceous, like the leaves but smaller bracteoles small, linear, numerous, red, pedicels slender, red, 25 to 75 in long, buds clavate, the head globose, flowers red, orange or almost white, the calyx red *Calyx* divided nearly to the base, lobes oblong-lanceolate, acute, 15 to 2 in long, much enlarged in fruit, stellate, the lobes closely embracing the drupe *Corolla*-tube slender, cylindric, puberulous, 5 to 7 in long, lobes nearly equal, elliptic, 2 to 4 in long, patent *Stamens* long exserted, filaments red, glabrous,

anthers oblong-reniform, cells parallel Ovary glabrous, cylindric, style very slender, stigmatic branches short Drupe obovoid, 1- to 4 pyrened (usually 1 only), pyrenes pyriform, endosperm crustaceous, reticulate Seeds conform to the pyrene, testa membranous, cotyledons unequal, fleshy, radicle very small Ait Hort Kew ed 2, IV 64, Vahl Syb II 74, Bot Reg t 406 Reichb Fl Exot t 208, Hassk Pl Jav Rai 488, Schauer in DC Prodr XI 668, Blume Bijdr 811, Miq Fl Ind Bat II 879, Clarke in Hook f Fl Br Ind IV 593, Hook f. Bot Mag t 7141 *C. pyramidale*, Andr Bot Rep t 628, Wall Cat 1802 *C. splendidum*, Wall Cat 1803 *Volkameria angulata*, Lour Fl Cochinch 389

KIDAH on low ground near sea-level, *King's Collector* (Kunstler) 1792 PENANG Wallich 1802, at Tanjung Bunga, *Curtis* 313 PERAK Wray 42, 2435 at L. W Resthouse, *Scortechini* 915, at Ipoh *Deschamps* at Larut, on rocks at 300 to 800 ft alt, *King's Collector* 6437 SELANGOR gap on Pahang side, at 2000 to 3000 ft alt, *Curtis* 3759 MALACCA *Griffith* 6050 SINGAPORE *Ridley* gardens, hedges, and waste places, *Deschamps* Bukit Mandai, *Goodenough* DISTRIB Siam (Hemsley in Journ Linn Soc XXVI 262)

14 CLEODENDRON SIPHONANTHUS, Br in Ait Hort Kew ed 2, IV 65 (1812) An erect, usually single stemmed, little branched shrub, reaching 4 to 8 ft in height, branchlets channelled, smooth haired Leaves membranous when dry, verticillate, 3 to 5 nate or opposite, the bases of the petioles joined by a pubescent ring, narrowly lanceolate or oblong lanceolate, shortly acuminate at apex, attenuate at base, both surfaces glabrous, the lower pale, margins entire or sinuate, recurved, 4 to 8 in long, 5 to 1 in broad, midrib prominent, main nerves 10 to 12 pairs, very short straight, joining prominent looped intra marginal nerves which start from the base, transverse nervules very few, petiole none or extremely short Panicle terminal, thyrsoid, leafy, reaching 8 to 18 in in length, and 4 to 6 in in diam branches red, verticillate, of lax peduncled few flowered cymes, bracts linear lanceolate, 5 in long, bracteoles subulate, pedicels 5 to 15 in long, puberulous, buds long, clavate, flowers white, changing to cream colour Calyx puberulous, divided three-fourths down, lobes ovate lanceolate, acute, densely clothed within with minute round glands, 3 to 4 in long, 15 in broad, fruiting calyx greatly enlarged, leathery, up to 15 in in diam, crimson Corolla tube funnel-shaped, glabrous, curved, 3 to 4.5 in long, about 1 in broad below, widening above, lobes spreading, obovate- or oblong-obtuse, 3 to 4 in long Stamens long exsert, filaments slender, glabrous, anthers oblong, 1 to 15 in long, cells parallel Ovary glabrous, obtuse, style very long, slender,

stigmatic branches short, rather thick. *Drupe* 1- to 4-lobed according to the number of pyrenes, about .5 in. in diam., exocarp fleshy, dark blue; pyrenes rounded except a slight flattening on the inner side, smooth, 4 in. by .25 in., endocarp crustaceous. *Seeds* conform to the pyrenes, testa thin, soft, cotyledons very fleshy, radicle very small. Wall. Cat 1784, Wight Ill. t. 173, Schauer in DC. Prodr. XI. 670, Brandis For Fl. 364, Dalz. & Gibs. Bomb. Fl. Suppl. 69; Miq. Fl. Ind. Bat. II. 883, Clarke in Hook. f. Fl. Br. Ind. IV. 595; Cooke Fl. Bomb. II. 433; Prain Beng. Plants 836 *C. verticillatum*, Don Prodr. Fl. Nep. 102, Schauer l.c. 671 *Siphonanthus indica*, Willd. Sp. Pl. I. 606, Lamk. Ill. t. 79, fig. 1, Roxb. Fl. Ind. III. 67. *S. angustifolia*, Willd. l.c. *Ovieda mutis*, Burm. Fl. Ind. 136, t. 43, figs 1, 2.

PERAK at Trong, Wray 3170.—DISTRIB India, Burma, Java, Sumatra, Celebes, Siam (*Schomburgk* 302). Often cultivated in gardens

15. *CLERODENDRON RIDLEYI*, King & Gamble in Kew Bull. 111 (1908) A small slender tree, reaching 15 ft. in height and 2 to 3 in. in diam., branches smooth, pale brown, branchlets (also rachis of inflorescence) quadrangular, shining. *Leaves* opposite, membranous; elliptic, elliptic-lanceolate or ovate, caudate-acuminate at apex, rounded or cuneate at base, both surfaces glabrous, the lower pale, margins entire, 3 to 7 in long, 1 to 3 in broad, midrib slender, prominent beneath, main nerves 5 to 7 pairs, the lowest pair from close to the base at an acute angle with the midrib, the rest more spreading, meeting in a looped intramarginal nerve, transverse nervules few, irregular, other reticulations not visible, petiole slender, .75 to 2 in long, winged by decurrent ridges from the base of the blade *Panicle* terminal, few-flowered, reaching with the peduncle at most 6 in long and 3 in broad, branches divaricate, 1 to 1.5 in. long, bracts leafy, lanceolate, acuminate, caducous, bracteoles linear, pedicels slender, .25 in. long, buds very long, clavate, flowers white (*Ridley*) or pale yellow (*Kunstler*). *Calyx* erect, deeply divided, lobes glabrous, lanceolate, caudate-acuminate, .5 to .7 in. long, often with scattered large peltate glands, fruiting calyx enlarged, enclosing the fruit, 1.5 in. in diam. when opened out, deep red in colour *Corolla*-tube cylindrical, slightly funnel-shaped at top, 3 to 3.5 in. long, very slender, lobes obovate, obtuse, 5 in. long, subequal. *Stamens* long-exsert; anther-cells parallel. *Ovary* glabrous, obtuse, 4-lobed, style very long, slender; stigmatic lobes very short. *Drupe* deep red, smooth, globose, fleshy, .5 in. in diam. with 4 to 1 pyrenes, pyrenes pyriform, slightly ribbed; endocarp crustaceous. *Seeds* conform to the pyrenes, testa membranous; cotyledons very thick, fleshy.

**PFRAK** in dense forest near Larut up to 300 ft *King's Collector*  
2944, 3988 **SELANGOR** at Batu Tiga *Ridley* 11862

**CLEODENIUM LOBBII** C. B. Clarke in Hook f Fl Br Ind IV 510 (1885) is a climbing shrub which in all probability does not belong to this genus. Mr Ridley informs us that it is very common in Borneo and that he thinks Lobbs specimen must have been collected at Kuching and not in Penang. It is a very handsome striking plant and has been cultivated. It has the upper leaves of the spray bright red flowers of a light salmon red and a horn shaped fruit about 2 in long. There is a good picture of it in Miss North's Gallery at Kew to which Mr Ridley has drawn our attention.

# 10. VITEX LIN

Trees or shrubs. *Leaves* opposite digitately 3 to 7 foliolate sometimes 1 foliolate leaflets usually entire sometimes dentate generally petiolulate. *Inflorescences* blue white or yellow in sessile or pedunculate cymes forming terminal or axillary or both terminal and axillary panicles or cymes bracts usually small often caducous. *Calyx* campanulate or tubular funnel shaped usually truncate or shortly 5 toothed sometimes bilabiate with 3 to 5 teeth. *Corolla* small 2 lipped tube long or short upper lip usually of 2 lower of 3 lobes the central lobe of the lower lip much the longest. *Stamens* 4 didynamous usually exerted anther cells various always attached at the tip only generally parallel at first afterwards divergent. *Ovary* 2 to 4 celled 4 ovuled style filiform stigma bifid. *Fruit* a globose or ovoid or obovoid drupe supported by the more or less enlarged calyx usually occupationally fleshy enclosing a bony pyrene normally 4 celled and 4 seeded but often with some of the cells suppressed the base of the pyrene sometimes hollowed in a cavity. *Seeds* obovate or oblong albumen 0 cotyledons usually fleshy radicle inferior. **DISTRIBUTION** About 120 species in all tropical and warm temperate regions.

Inflorescence terminal with occasional additional branches in the axils of uppermost leaves —

Leaves without wings to the petioles

Shrubs or small trees leaves membranous grey pubescent beneath

Leaves 1 to 3 foliolate margins entire petiole under 1 in long, calyx under 1 in long

1 *V. trifolia*

Leaves 3 to 5 foliolate margins sometimes crenate petiole over 1 in long calyx over 1 in long

2 *V. Negundo*

Trees leaves chartaceous or coriaceous not grey pubescent beneath —

Leaves 1 foliolate coriaceous —

Leaves 1 to 4 5 in broad, with a prominent intra marginal nerve, panicle branches spicate

3 *V. holophylla*

- Leaves 2 to 3 in broad no prominent intramarginal nerve, panicle branches racemose 4 *V. Clarkeana*
- Leaves 3 foliolate leaflets petiolulate —
- Leaves coriaceous inflorescence of stout panicles up to 8 in long, the flowers clustered 5 *V. coriacea*
- Leaves chartaceous, inflorescence of slender panicles the flowers not clustered 6 *V. siamca*
- Leaves 3 to 5 foliolate chartaceous or coriaceous —
- Leaflets sessile or subsessile inflorescence densely tawny pubescent, bracts large conspicuous 7 *V. pubescens*
- Leaflets petiolulate, inflorescence thinly cinereous tomentose bracts very small or none —
- Leaflets long acuminate panicle branches slender with few flowered cymules, corolla tube without a ring of hairs within 8 *V. heterophylla*
- Leaflets short acuminate panicle branches stout with many flowered cymules corolla tube with a ring of hairs within 9 *V. sumatrana*  
var *unicolata*
- Leaves with winged petioles the wings broad
- Leaflets long lanceolate, scabrous dotted under 2.5 in broad 10 *V. pteropoda*
- Leaflets elliptic or elliptic obovate over 3 in broad not scabrous dotted 11 *V. peralata*
- Inflorescence axillary —
- Leaves 3 to 5 foliolate glabrate, cymes peduncled reaching 4 to 5 in long 12 *V. glabrata*
- Leaves 3 foliolate, cymes sessile under 1.5 in long
- Leaves and cymes densely tawny pubescent drupe with a hard ridged pyrene having 3 to 4 seed bearing cells above and an empty cavity below —
- Calyx lobes oblong lanceolate 2.5 in long conspicuous bracts large conspicuous, leaves large 13 *V. longisepala*
- Calyx lobes short acute inconspicuous, bracts minute, caducous leaves small 14 *V. vestita*
- Leaves glabrate, cymes sparingly fulvous hairy calyx 2 lipped 15 *V. gamosepala*

We have not maintained Clarke's subgenus *Glossocalyx* because the species *V. gamosepala* for which it was established is so very nearly allied to *V. longisepala* and *V. vestita* that if any subgenus were necessary it ought to be one which would include these three so different in inflorescence and fruit from the rest of the genus and closely allied to *Premna* and *Gmelina*.

1 *VITEX TRIFOLIA*, Linn Sp Pl 638 (1753) A shrub or small tree bark smooth, pale grey, branchlets quadrangular, covered with an appressed hairy tomentum. Leaves membranous, 1 to 3 foliolate the terminal leaflets sessile or very shortly petiolulate, the lateral leaflets sessile leaflets elliptic or obovate, or almost orbicular (speci

ally when 1-foliate), obtuse or acute at apex, rounded or cuneate (especially the terminal, if 3) at base, upper surface glabrous, lower densely white-tomentose, margins entire, end leaflet 1 to 3 in long, .5 to 1.25 in broad, lateral leaflets smaller, main nerves 8 to 12 pairs, inconspicuous, petiole slender, .5 to 1 in long. *Panicles* terminal, oblong, white-tomentose, reaching 1 to 5 in in length, the rachis sub-quadrangular, cymes opposite up to 1 in long, brachiate, bracts linear, minute, flowers lavender to blue. *Calyx* sessile, campanulate, .075 to 1 in long, tube ribbed from the teeth, white-tomentose, teeth 5, regular, acute, very small. *Corolla* 25 to 35 in long, tube scaly-pubescent without, villous within at the insertion of the stamens, upper lip of 2 short rounded lobes, lower of 3 lobes, the lateral lobes .06 in long, the midlobe longest, 1.25 in long, villous, hairy within and usually incurved. *Stamens* exsert, filaments hairy-villous near the base, anther-cells curved. *Ovary* rounded, depressed, glandular-dotted. *Drupe* ellipsoid, depressed at top, 2 in in diam, slightly ribbed, glandular-dotted, half-enclosed in the somewhat enlarged calyx. Linn f Suppl 293, Lamk Diet II 613, Roxb Fl Ind III 69, Bot Mug t. 2187, Wall Cat 1743, Schauer in DC Prodr XI 683, Blume Bijdr 812, Miq Fl Ind Bat II 859, Benth in Fl Austral V 66, Bedd Fl Sylv CLXXII, Brandis For Fl 370, Clarke in Hook f Fl Br Ind IV 583, Trimen Fl Ceyl III 356, Cooke Fl Bomb II 428, Prian Beng Plants 833, Koord & Val Bijdr VII 200. *V. ovata*, Thunb Fl Jap 257, Lamk l c, Hook & Arn Bot Beech Voy 206, t 47. *V. repens*, Blanco Fl Filip 13. *V. incisa*, Wall Cat 1746 (partly, not of Lamk). *V. Agnus castus* var, Kurz For Fl II 269. "*Lagonium vulgare*," Rumph Herb Amb IV 18, t 18. "*Caranosi*," Rheede Hort Mal II t 11.

PERAK *Scortechini* 644, 1459. MALACCA *Griffith Munqay* (K D) 1206, *Hervey*. SINGAPORE at Pulau Obun, *Kunstler* 57. —DISTRIB India, Ceylon, Malay Archipelago, North Australia, Japan.

2 *VITEX NEGUNDO*, Linn Sp Pl 638 (1753). A large shrub or small tree, bark thin, grey, branchlets quadrangular, covered with an appressed hairy tomentum. *Leaves* membranous, 3- to 5-foliate, the terminal leaflet petiolulate (up to .75 in long), the lateral leaflets shortly petiolulate (usually about .25 in), sometimes nearly or quite sessile, leaflets lanceolate, acuminate at apex, attenuate at base, upper surface nearly glabrous, lower densely white-tomentose, margins entire or sometimes coarsely crenate, end leaflet 2 to 4 in long, .5 to 1.25 in broad, lateral leaflets shorter, main nerves about 15 pairs with a few secondary nerves between, petiole slender, 1 to 1.5 in long, white-tomen-



tose *Panicles* 1 to 3 together, terminal, oblong-pyramidal, white-tomentose, reaching 12 in long, the rachis quadrangular, peduncle of each branch variable, 1 to 4 in long, cymes opposite, reaching 1 in in length, but usually shorter, brachiate, at first dichotomous, bracts linear, short, the lowest somewhat leafy, flowers blueish-purple *Calyx* sessile, campanulate tube 1 to 15 in long, faintly ribbed, enlarged in fruit, teeth regular, acute, 05 in long, sometimes slightly cuspidate *Corolla* 25 to 35 in long tube scaly-pubescent and slightly glandular without, villous within at the insertion of the stamens and on the midlobe of the lower lip upper lip 2-lobed, lobes rounded, recurved, lower lip 3 lobed, the midlobe much the longest and obtuse at tip, lateral lobes spreading *Stamens* exsert filaments villous at the base, anther-cells curved *Ovary* rounded, very slightly glandular *Drupe* ovoid, depressed at top, 2 in in diam, slightly ribbed, glandular dotted Roxb Fl Ind III 70 Wall Cat 1744 Schauer in DC Prodr XI 684 Wight Ic t 519 Bedd Fl Sylv CLXXI Brandis For Fl 369 Miq Fl Ind Bat II 890 Clarke in Hook f Fl Br Ind IV 583 Trimen Fl Ceyl III 357 Cooke Fl Bomb II 428 Prain Beng Plants 833 Koord & Val Bijdr VII 201 *V bicolor* Willd Enum Hort Botol 660 Schauer l c 683 Dalz & Gibs Bomb Fl 201 *V arborea*, Desf Cat Hort Paris, 391 *V paniculata*, Lamk Dict II 612 Roxb l c 71 "*Layondrum litoreum*" Rumph Herb Amb IV t 19 "*Bem nosi*" Rheede Hort Mal II t 12

PFTANI at Tomoh, Machado (Ridley 5813) MALACCA Griffith SINGAPORE Ridley 4118 — DISTRIB India, Ceylon, Malay Archipelago Ridley thinks it is probably not really indigenous in the Peninsula

3 VITEX HOLOPHYLLA, Baker in Kew Bull 25 (1896) A small tree branches with yellowish white bark branchlets also yellowish shining, obtusely quadrangular innovations tawny tomentose *Leaves* opposite, coriaceous, simple ovate lanceolate or ovate oblong, acuminate at apex, rounded at base both surfaces glabrous, upper olive-green, lower ferruginous margins entire, 4 to 12 in long, 15 to 45 in broad, midrib stout, prominent, keeled above main nerves 7 to 9 pairs at an angle of  $70^{\circ}$  with the midrib, curving upwards to meet in an intramarginal looped nerve all slightly impressed above, raised beneath, secondary nerves many, irregular reticulations prominent, netted petiole 75 to 15 in long prominently jointed at both ends, younger ones puberulous *Cymes* in terminal panicles of rather long glomerulate spikes reaching 6 to 7 in long and 3 to 4 in broad, densely tawny-tomentose when young, afterwards glabrate, bracts lanceolate or elliptic-lanceolate, caducous, 1 to 2 in long, bracteoles 2, much smaller, flowers in each

glomerule about 3 on each side, sessile *Calyx* campanulate, tawny-pubescent and glandular, 1 in long lobes 5 subequal, deltoid calyx in fruit much accrescent, cup shaped, truncate, 5 in in diam *Corolla*-tube funnel-shaped, pubescent and glandular without, sparsely villous within, 2-lipped, upper lip shortly 2 lobed, the lobes rounded, reflexed, lower lip 3 lobed, midlobe long, very villous within *Stamens* exsert, filaments slightly villous anther cells divaricate, often recurved *Ovary* rounded, villous at tip *Drupe* globose or obovoid, 75 in in diam, depressed at apex pericarp crustaceous cells 2 seed usually 1

JOHORE at Sunggei Kaliang, *Ridley* 4031—DISTRIB Borneo (at Sandakan, *Governor Creagh Lowe* at Sarawak, *Beccari* 1111)

4 VITEX CLARIFLORA, King & Gamble A small shrubby tree, reaching about 15 ft in height branchlets pale brown, round glabrous or puberulous *Leaves* coriaceous, 1-foliate leaflet sessile, lanceolate or oblong lanceolate, acuminate at apex, rounded at base both surfaces glabrous greyish when dry, the lower punctulate margins entire, recurved 6 to 12 in long 2 to 3 in broad midrib stout very prominently raised on the lower, slightly on the upper surface main nerves 12 to 20 pairs, irregularly but slightly curving to near the margin where they sharply bend parallel to it, all but the few lowest joining in an intramarginal looped nerve secondary nerves few between the main nerves reticulations irregular not transverse and not prominent petiole 5 to 75 in long, jointed at the base of the leaflet *Panicle* terminal, puberulous, 12 to 18 in long, peduncle stout, angled, 2 to 4 in long main branches usually 3 elongate, the middle one usually longest, bearing distant opposite corymbose cymes of rather large flowers the cymes 1 in rarely 2 in long bracts small, caducous, bracteoles minute pedicels about 1 to 2 in long, much thickened in fruit, flowers pale blue the lip darker *Calyx* tube campanulate, tawny-pubescent, 125 to 15 in long much enlarged in fruit lobes 5 irregular, short, acute *Corolla* tube 25 in long, pubescent without and at the insertion of the stamens within, 2 lipped, upper lip shortly 2-lobed, lobes recurved lower lip 3 lobed, the midlobe twice as long as the recurved sides lobes, constricted below, spreading above, crenate, villous *Stamens* exsert, filaments villous at base, thickened, anther-cells elliptic *Ovary* globose, depressed, tawny pubescent, style slender, as long as stamens, stigma shortly 2 lobed *Drupe* ovoid, 3 in in diam or longer, tawny pubescent, seed apparently 1 only *V. simplicifolia*, Clarke in Hook f Fl Br Ind IV 586 (1885)

DINDINGS Pangkore Island, *Curtis* 1611 PERAK *Scortechini* 1383, at Telok Sera, *Ridley* 7990, in forest overlooking Bernam River, *King's Collector* 8788 MALACCA *Griffith* (K D) 6064 JOHORE

Lake & Kelsall on Sembrong River, 4059 —DISTRIB Borneo (Motley 1269, Beccari 166, Lobb, Haviland 1580)

The name of this plant has had to be changed, as that of *simplicifolia* was already occupied by *V. simplicifolia*, Oliv in Trans Linn Soc XXIX 133, t 130 (1875), a Central African plant collected by the Speke & Grant Expedition

5 VITEX CORIACEA, Clarke in Hook f Fl Br Ind IV 586 (1885)  
A tree, reaching 60 ft or more in height and 15 to 20 in in diam, branches slender with greyish-brown fissured bark, branchlets pale brown, obscurely quadrangular, striate, puberulous. Leaves coriaceous, 3 foliolate, leaflets petioluled, entire, lanceolate or oblanceolate, obtuse or acute at apex, long-attenuate at base, both surfaces glabrous, upper shining, lower dull, minutely glandular, prominently reticulate, 3 to 5 in long, 1 to 2 in broad, the midlobe only slightly longer than the others midrib prominent, main nerves 6 to 7 pairs, curving upwards to and along the margin where they anastomose, joined by prominent but irregular netted reticulations all raised on the lower surface petiole 1 to 2 in long, puberulous, angular, the apex swollen, petiolule of mid-leaflet about 5 in long, of the side ones about 25 in. Panicles terminal, strict, sessile, minutely fulvous-puberulous, reaching 6 to 8 in in length and 3 to 4 in in breadth, branches many, elongate, ascending, subquadrangular, the main peduncles often 3 in long or more, the flowers in small often distant clusters, bracts small, linear, flowers violet or blue Calyx funnel shaped, fulvous pubescent, enlarged and cup-like in fruit, tube 1 in long, lobes 5, rounded, .05 in long Corolla 2 lipped, tube fulvous pubescent without except at the base, as also within at the insertion of the stamens, .25 in long upper lip 2 lobed, lobes rounded, very pubescent, ciliate, 1 in long, lower lip 3 lobed, midlobe ovate crenate, contracted at base, shaggy-villous within, .15 in long, side lobes rounded, reflexed, .125 in long Stamens exsert, filaments thickened, pubescent, anthers curved so as nearly to meet at the tips Ovary globose, only slightly glandular, style longer than filaments, pubescent, stigma bifid, the lobes reflexed Drupe ellipsoid, very smooth, .5 in long, .25 to .35 in broad, seated on the enlarged cup shaped calyx, pericarp rather thin Seed apparently 1 only

KEDAH lower slopes of Kedah Peak, Ridley 5555 PENANG Government Hill, Curtis 323 PERAK on Waterfall Hill, at 1000 ft, Wray 2225, Scortechini 2082, in hill forests, at 500 to 800 ft, King's Collector 4388, 4638, 7782, 8135 MALACCA Griffith (K D) 6065, 1, Mangay (K D) 1203 at Ayer Panas and Bukit Bruang, Derry 98, 1029 SINGAPORE T Anderson 183

6 *VITEX SIAMICA*, Williams in Bull Herb Boiss Ser 2, V 431 (1905)

A tree with spreading branches, reaching 30 to 40 ft in height and 15 to 20 in in diam of stem branchlets rather slender, dark brown, glabrous, with prominent usually elongated lenticels. *Leaves* coriaceous-chartaceous, 3 foliolate, the leaflets all petiolulate, glabrous, entire leaflets ovate or ovate-lanceolate, acuminate often bluntly at apex, rounded or cuneate at base, the side leaflets sometimes slightly asymmetric, the middle leaflet 2.5 to 5 in long, .75 to 1.75 in broad, the side ones usually about one third smaller midrib slender raised beneath, main nerves 12 to 24 pairs, usually regularly spaced and parallel, only slightly curving to the margin and then anastomosing in an obscure looped marginal nerve, all raised beneath secondary nerves and reticulations firmly netted petiole 1 to 2 in long, slender petiolules about .5 in long, the middle one only slightly longer than the others. *Panicles* terminal, with sometimes additional branches from the axils of the upper leaves, minutely puberulous, sessile, many flowered, reaching sometimes 12 in in length rachises very slender, puberulous, obscurely 4 angled branches at first 3 chotomous, ultimately ending in slender dichasia bracts many, conspicuous, persistent, linear lanceolate, .25 to .75 in long bracteoles 2 to each pedicel, similar but slightly smaller, pedicels slender, sometimes 0 flowers small, pale blue or white (calyx tube campanulate, pubescent and with glandular dots without, .05 in long teeth 5, acute, .025 in long, in fruit much enlarged, cup shaped. *Corolla* small, 2 lipped tube 1 in long pubescent on both sides except at the base and with many yellow glands upper lip with 2 short obtuse lobes lower with 3 obtuse lobes, the middle lobe the longest and villous inside. *Stamens* included or very slightly exsert, filaments thickened, villous anther cells ellipsoid, parallel. *Ovary* rounded, depressed, sparsely glandular style rather thick, as long as stamens stigma shortly 2 fid. *Drupe* .15 in in diam, globose, depressed at top, obscurely 4 lobed, glandular, black when dry, pyrene with thin putamen. *Seeds* usually 1 to 2, ovate, acute at base, flattened testa thin. *V. sympodiophora*, P Bruhl MS in Herb Calc. *V. lankavana* H H W Pearson, MS in Herb Penang.

KEDAH at Coah, Langkawi Island, *Curtis* 1683 at Dayong Bonting, Langkawi, *Fox* 12720 PERAK on Batu Kurau top, *Scortechini* 1618, in open jungle on the top of limestone hills, at 400 to 1000 ft, *King's Collector* 7034, 8264 SELANGOR top of rocks, Gua Batu, *Ridley* 8535

Bruhl's description, with drawings, in the Calcutta Herbarium, is most complete, and has been of great use, especially as perfect flowers are very few on the specimens available

7 *VITEX PUBESCENS*, Vahl Symb III 85 (1794) A large tree, reaching a height of 50 to 60 ft or more, bark ash-coloured, fissured, branchlets quadrangular, brown, lenticellate, innovations tawny-pubescent *Leaves* chartaceo-coriaceous, digitately 3- to 5 foliolate, the middle leaflet always largest, the two next large, the basal pair when present much smaller leaflets entire, sessile or subsessile, obovate or elliptic or broadly lanceolate, obtuse or acuminate at apex, rounded or cuneate at base glabrescent on the upper surface except on the nerves, minutely pubescent on the lower surface middle leaflet 6 to 8 in long by about 3 in broad, rest smaller in gradation midrib stout main nerves 12 to 20 pairs, regular, curving gently upwards and connected by prominent nearly parallel transverse nervelets petiole 2 to 4 in long, deeply channelled above petiolules when present under 25 in long *Panicles* terminal densely tawny-pubescent pyramidal, usually sessile, reaching 10 in in length and 6 to 8 in in breadth rachises sharply quadrangular, 1/2 inch poduncles often 3 to 4 in long bracts many, conspicuous, persistent, ovate or spatulate, those of main nodes sometimes leaf-like bracteoles similar to the bracts but smaller pedicels none or very short flowers blue or lilac *Calyx* campanulate thickly tomentose, 15 to 25 in long lobes 5 acute *Corolla* 2 lipped, gibbous tube broad pubescent and glandular without except at the base villous within at the insertion of the stamens glabrous below it, about 25 in long upper lip 2 lobed lower 3 lobed the midlobe much the longest, villous within and concave at tip, the others rounded, reflexed *Stamens* exert filaments broad and villous at the base anther cells elongate connected only at tip *Ovary* glabrous style slender, longer than stamens stigma shortly bifid *Drupe* black globose 2 to 3 in long depressed at top, faintly ribbed, 4 celled Schauer in DC Prodr XI 685 Blume Bijdr 812 Dene in Nouv Ann Mus d Hist Nat III 401 Bedd Fl Sylv XXI Kurz For Fl II 271 Miq Fl Ind Bat II 861 Clarke in Hook f Fl Bt Ind IV 585 Koord & Val Bijdr VII 202 Plain Beng Plants 833 *V. arborea*, Roxb Hort Beng 46, and Fl Ind III 73 Jack in Mal Misc I 18, and in Hook Bot Misc I 285 Wall Cat 1747 Wight Ic t 1465 *V. maequifolia*, Turcz in Bull Soc Imp Nat Mosc II 223

PENANG Wallich 1747 part, J Scott, Curtis 64 PERAK at Taiping, Wray 139, King's Collector 267, Scortechin 77, 99, 916 MALACCA Griffith, Mangay (K D) 1204, Derry SINGAPORE Wallich 1747 part, Schomburgk 48 Cantley 17, Ridley—DISTRIBUTION India, Burma, Malay Archipelago

8 *VITEX HETEROPHYLLA*, Roxb Hort Beng 46 (1814), and Fl Ind III 75 (1832) A large tree, reaching 80 ft in height and 3 ft in diam

of stem, branchlets quadrangular, dark grey, lenticellate, gland-dotted. *Leaves* chartaceous, 5-foliate, the middle leaflet longest, the next pair not much smaller, the lowest pair sometimes nearly as long, sometimes reduced, all petiolulate or the lowest sometimes sessile, leaflets entire, variable, elliptic or elliptic-oblong or ovate or obovate, often long-cuspidate acuminate at apex, attenuate or somewhat rounded at base, the side leaflets usually unequally both surfaces glabrous, dark reddish-brown when dry, the upper with white, the lower with yellow glands, middle leaflet 5 to 7 in long, 3 to 4 in broad, the rest smaller in proportion midrib stout, slightly impressed above, raised beneath main nerves 7 to 10 pairs curving upwards to and along the margin and joined by fairly regular and prominent transverse nervules, petiole 3 to 6 in long, terete below and flattened above, petiole of middle leaflet 5 to 1 in long, of next pair about 5 in, of the lowest pair 0 to 25 in long. *Panicles* terminal the lowest nodes often leafy, thinly cinereous tomentose, usually sessile thyrsoid reaching 12 in in length and 8 in in diam. branches opposite, elongate, quadrangular, bearing interrupted pairs of cymes usually 5 to 75 in long, bracts 0 or very small pedicels very short flowers pale yellow with a blue lip. *Calyx* tubular campanulate, grey pubescent and glandular, 1 in long, enlarged and broadened and ribbed in fruit teeth 5, small, acute. *Corolla*-tube broadly funnel shaped, pubescent and dotted with yellow glands without, glabrous within except a row of villous hairs within below the insertion of the stamens 2 lipped, the upper lip of 2 recurved acute lobes 1 in long, the lower of 3 lobes, the side ones recurved, obtuse, 1 in long, the middle one oblong, 15 in long villous on the throat. *Stamens* exserted, curved filaments glabrous anther cells oblong, at first curved downwards, afterwards divaricate. *Ovary* rounded, glabrous except a few glandular dots style slender thickened above, stigma shortly 2 lobed. *Drupe* pyriform, depressed at top, sparsely glandular, blackish-grey and wrinkled when dry pyrene very hard, ribbed, hollowed at base. *Seeds* oblong, flattened, 2 in long, 0.75 in broad, testa thin, spongy, cotyledons oblong, 1 in long, radicle 0.4 in long. Wall Pl As Rar 15, t 226, and Cat 1745, Schauer in DC Prodr XI 686 partly, Clarke in Hook f Fl Br Ind IV 585, Prain Beng Plants 833.

PERAK at Tapa, Wray 197, in hill forests up to 1000 ft, *King's Collector* 6034, 7530, 10063, 10377 — *DISTRIB* India (Sikkim, Assam and East Bengal)

9 VITEX SUMATRANA, Miq Fl Ind Bat Suppl 567 (1860)

VAR *urceolata*, King & Gamble A tree, reaching 40 to 60 ft in height and 2 ft in diam of stem, branchlets quadrangular, channelled

at the sides from raised lines descending from the sides of the petiole, glabrous or very slightly puberulous. *Leaves* chartaceous, 3- to 5-foliate, the middle leaflet longest, the next pair not much smaller, the lowest pair a good deal smaller, all petiolulate or the lowest pair sessile, leaflets entire, obovate or oblong obovate, shortly suddenly acuminate at apex, rounded often unequally at base, upper surface glabrous, except on the nerves, olivaceous brown, shining, rough, minutely white-gland-dotted lower surface glabrous, paler than the upper, with minute yellow glands, middle leaflet 4 to 6 in long, 2.5 to 3 in broad, rest gradually smaller but similar midrib strong, impressed above, main nerves about 10 pairs, irregular, curving upwards to and along the margin and joined by rather irregular transverse nervules, petiole 1.5 to 4 in long, quadrangular but not winged petiolule of middle leaflet about 1 in long, of next pair about .5 in long, of the lowest pair 0 to .25 in long. *Panicles* terminal, thinly cinereous tomentose, thyrsoïd, usually sessile, reaching 8 in in length and 5 in in diam, branches elongate, cylindric bearing interrupted whorls of pairs of many-flowered cymules about 5 in long branch-peduncles 1 to 2 in long, bracts linear 1 to 1.5 in long recurved, deciduous buds large, reaching .25 in long. *Calyx* tubular campanulate, 1.5 in long, flattened in fruit and enlarged, tube tawny pubescent and glandular without, glabrous within, teeth short, acute, rounded in fruit. *Corolla* tube curved, contracted at the throat .25 in long, pubescent without except at the base, quite glabrous within 2-lipped, upper lip of 2 erect crenate lobes 1 in long lower of 3 lobes, midlobe broad, crenate, obtuse, .2 in long, side lobes shorter, reflexed, all pubescent without, glabrous within. *Stamens* curved exsert filaments glabrous, anther cells attached only at one point, curving to nearly erect. *Ovary* conical with a few glands on its top style thickened, sigmoid below, glabrous, stigma shortly 2-lobed. *Drupe* globose, depressed, 3 to 5 in long, shortly apiculate, wrinkled when dry, pyrene very hard. *Seeds* flattened, oblong, testa thin, spongy. *V. urceolata*, Clarke in Hook f Fl Br Ind IV 585 (1885) *V. heterophylla*, Schauers in DC Prodr XI 686 partly *V. Loureirii*, Herb Wight, not of Hook & Arn.

PERAK in Upper Perak, at 300 ft, Wray 3653, *Scortechini* 61, in dense mixed jungle, at 400 to 600 ft, King's Collector 10406 MALACCA Griffith (K D) 6064, *Mairgay* (K D) 1205, 1207

As pointed out by Clarke, this variety differs in the glabrescent foliage, larger flowers and larger drupes *V. heterophylla*, Roxb, with which Koorders & Valetton would combine *V. urceolata*, has different leaves and inflorescence and a corolla villous within

10 *VITEX PTEROPODA*, Miq Fl Ind Bat Suppl 567 (1862) A tree, reaching 40 to 60 ft in height and a considerable diameter of stem, branchlets stout, pale brown, obscurely quadrangular. Leaves coriaceous, 5 to 7 foliolate, only the lowest pair much smaller than the others, petiole prominently and very broadly winged leaflets long, lanceolate or oblong-lanceolate or oblanceolate, acuminate at apex, cuneate at base, both surfaces glabrous, minutely dotted and so scabrid to the touch, margins recurved 4 to 20 in long, 1 to 2.5 in broad, midrib stout, main nerves 12 to 16 pairs prominent on the lower surface, at first somewhat straight and then curving to and along the margin till they meet, joined by prominent transverse nervules and reticulations petiole 4 to 7 in long broadly winged, the wings broadest (1 to 1.5 in on either side) at a short distance from the base, sometimes narrowed only near the top, sometimes earlier and then curving upwards, often cordate or auricled at both ends petiolules 5 to 1 in long, bordered by the decurrent margins of the leaflet blades Panicles terminal or partly axillary to uppermost leaves, subsessile, glabrous, reaching 1 ft in length and about 8 in in diam rachises slender, angular, striate or channelled peduncles of all classes, primary secondary and tertiary, long, ending in few sparse few flowered short cymes scarcely 2.5 in long, bracts linear, acuminate, 1 to 1.5 in long, persistent bracteoles under the calyx similar but shorter pedicels 0 or very short flowers white with a pink tinge Calyx urceolate, glabrous, 1 in long teeth 5 acute Corolla tube short 0.75 to 1 in long, puberulous without glabrous or very slightly villous within near the base lobes short, obtuse Stamens scarcely exsert filaments villous, anther cells ellipsoid, nearly parallel Ovary globose, much depressed, glabrous style slender, stigma shortly 2 forked Drupe ovoid oblong, .75 to 1 in long, .5 in in diam, smooth seated on the spreading, much enlarged calyx, pericarp very thick seed 1

PERAK *Scortechini*, in dense jungle or low ground near Larut, King's Collector 5249, 6668 — DISTRIBUTION Sumatra (*Teysmann*)

It is unfortunate that we could only find in all the specimens available one broken and imperfect corolla. The tree is a remarkable one, and is clearly very nearly allied to *V. per-alata*, King, but differs in the long narrow leaflets with scabrid points the glabrous, usually terminal sparsely flowered panicles short corolla tube and smaller drupes. The broad wings to the petioles are much the same in both. The specimen of *Teysmann* at Kew consists only of a couple of leaflets about 20 in long.

11 *VITEX PER-ALATA*, King MS in Herb Calc, Kew Bull 112 (1908) A spreading tree, reaching 80 ft in height and 2 ft in diam of stem, branchlets very thick, angular, striate, dark brown. Leaves



coriaceous, 5- to 7-foliate, only the lowest pair much smaller than the others, petiole prominently and very broadly winged, leaflets elliptic or elliptic-obovate, acute at apex, long-attenuate at base, both surfaces glabrous, margins recurved, middle lobe 6 to 20 in long, 3 to 6 in. broad, the rest smaller in proportion, midrib stout, impressed above, raised beneath, main nerves 10 to 14 pairs, prominently raised beneath, curving upwards to and along the margin, joined by a conspicuous (on upper surface) network of reticulations, petiole 3 to 6 in long, the wings broad below and almost cordate, the breadth (the broadest at 1 to 2 in above the base) reaching 1.5 to 2 in on either side at widest, curving upwards rather abruptly or gradually to the top, and veined like the leaves petiolules often 0, when present scarcely reaching 25 in. long. *Panicles* terminal or sometimes axillary to the uppermost leaves, sessile or peduncled, puberulous, reaching 2 ft in length and about 1 ft in diam, rachises angular, channelled, peduncles up to 8 in long, very stout, somewhat flattened, secondary peduncles of branches in whorls of 4 around the main rachis, up to 5 in long, flowers in short opposite or alternate many-flowered cymes, about 5 in long, along the branches bracts linear lanceolate, 1 to 2 in long, persistent, pedicels 0 or very short, flowers light blue with brown markings. *Calyx* pink, shortly urceolate, tawny-pubescent, 1 to 1.5 in long, teeth short, acute, in fruit slightly enlarged and recurved. *Corolla*-tube campanulate, 2.5 in long, pubescent without, villous within around the point of insertion of the stamens and up to the midlobe of the lower lip, upper lip of 2 ovate acute lobes 1 in long, the lobes reflexed, lower lip of 3 lobes, side lobes oblong, rounded, 1.5 in long, reflexed, midlobe broad, obtuse, 2 in long, all puberulous. *Stamens* exsert, filaments flattened at base, villous hairy, anther-cells ellipsoid, rather short, slightly divaricate. *Ovary* rounded, depressed, villous at top, glabrous below, style slender, slightly longer than the stamens, stigma shortly 2 forked. *Drupe* ovoid-conoidal, smooth, longitudinally ribbed, 1.5 in long by 1 to 1.25 in broad, pericarp very thick, pyrene with rather soft shell. *Seed* 1, testa membranous, cotyledons orbicular, flat.

PERAK at Simpang, Wray 2029, 2254, 2305, in dense jungle on low wet ground near Larut, King's Collector 2064, 6187, 6874, 8299.

This must be a splendid tree and worthy of cultivation for ornamental purposes. The large fruit, resembling that of the walnut, and the broad wings to the leaf petioles are very characteristic.

12 VITEX GLABRATA, Br Prodr Fl Nov Holl 512 (1810) A large tree, branchlets pale brown, obscurely quadrangular, innovations

fulvous-tomentose *Leaves* chartaceous, digitately 3- to 5-foliate, the lowest pair rather smaller than the others, the middle leaflet slightly larger, leaflets entire, petiolulate, obovate elliptic or elliptic-oblan-ceolate, acuminate at apex often obtusely, attenuate or cuneate at base, both surfaces grey-pubescent when young, afterwards glabrate or with scattered appressed hairs and a few glands beneath, the nerves beneath pubescent and with tufts of hair in the axils, 2 to 6 in long, 1.5 to 2.5 in broad, midrib slender, impressed above, raised beneath, main nerves 10 to 20 pairs, regular, slender, the uppermost ones obscure, slightly curved to the margin, transverse nervules and reticulations obscure, petiole 3 to 6 in long, angular, channelled above, end petioles 7.5 to 1 in long, rest 2.5 to 5 in long, angled and channelled *Cymes* axillary corymbose, peduncled, puberulous, reaching 4 to 5 in in length and 2 to 3 in in diam peduncles slender, angular, up to 2 in long, branches markedly dichotomous, spreading, bracts linear, pubescent, caducous, pedicels slender, 0 to 1 in long, flowers white, the lip blue purple *Calyx* campanulate, .05 to 1 in long, pubescent without, enlarged in fruit teeth 5 very short, acute *Corolla* tube broadly cylindric, 2 in long, pubescent without, glabrous within except a ring of villous hairs at the insertion of the stamens, the hairs extending up the midlobe of the lower lip, upper lip with 2 obtuse recurved lobes 1.5 in long, lower lip 3-lobed, the side lobes recurved, 1.5 in long, the midlobe spreading, .25 in long, densely villous *Stamens* much exsert, filaments villous anther-cells short, ellipsoid, divaricate *Ovary* globose, pubescent at top, style slender, as long as stamens, stigma spreading *Drupa* ovoid or obovoid, succulent, 3 to 5 in in diam, smooth Schauer in DC Prodr XI 695, Benth Fl Austral V 68 Clarke in Hook f Fl Br Ind IV 588, Koord & Val Bijdr VII 208, Prain Beng Plants 833 *V. Cunninghami*, Schauer l c 691 *V. leucorylon*, Schauer l c 692 in part, Kurz For Fl II 273, Miq Fl Ind Bat II 864, not of Linn f *V. bombacifolia*, Wall Cat 1749, Walp Rep IV 86 *V. pallida*, Wall Cat 1751

KEDAH in dense jungle near sea-level, *Kunstler* 1763 PENANG *Curtis* 1071 —DISTRIB India (Assam to Chittagong), Burma, Java, Siam, Cochin China, North Australia and Queensland

13 *VIREX LONGISEPALA*, King & Gamble in Kew Bull 112 (1908) A small or moderate-sized tree, branchlets rather stout, obscurely quadrangular, softly tawny-pubescent as are the innovations *Leaves* membranous, trifoliate, the middle leaflet largest and petiolulate, the side ones subsessile, leaflets ovate or elliptic-ovate, abruptly caudate-acuminate at apex, the middle leaflet acuminate or cuneate at base, the

side ones cordate or rounded or acute and unequal, the upper surface sparsely hispid and gland-dotted, the lower tawny-pubescent, villous on the nerves and gland-dotted, margins entire, 4 to 12 in long, 2 to 6 in broad, midrib stout, main nerves 8 to 15 pairs, curving outwards to and along the margin and joined by many transverse nervules and reticulations, petiole 2 to 6 in long, densely tawny-pubescent, petiolule of middle leaflet 25 to 2 in long, of side leaflets none or under 5 in long. *Cymes* axillary, opposite, tawny-pubescent, 1 to 2.5 in long, main peduncles usually 2, vertically arranged, 1 to 1.5 in long, branches 2 to 3 chotomous, spreading, corymbose, bracts conspicuous, narrowly lanceolate, 25 to 75 in long, persistent, pedicels about 1 in long, flowers primrose yellow. *Calyx* villous, with golden brown hairs, tube campanulate, 1 in long, lobes 5 subequal, oblong-lanceolate, 25 in long, conspicuous. *Corolla* tube slender, funnel-shaped, 4 to 5 in long prominently dotted with yellow glands, 2-lipped with a scanty ring of hairs within at the insertion of the stamens, 15 in above the base of upper lip shortly 2-lobed, the lobes rounded, lower lip 3-lobed, side lobes reflexed, middle lobe narrowed below, broadened above and fimbriate, twice as long as side lobes. *Stamens* exert filaments glabrous, slender, anther-cells elongate, narrow, parallel. *Ovary* conoidal on a cylindric base, the top densely yellow-glandular, style slender, stigma bifid. *Drupe* ovoid, black, smooth, gland-dotted, 3 in long, pyrene hard, reticulately ridged, with 3 to 4 fertile cells near the top and a large cavity below. *Seeds* obovoid, slightly flattened, .075 in long, testa thin.

PENANG at Batu Kawan, *Curtis* 395 PERAK at Bujong Malacca, *Ridley* 9723 at Tapa, *Wray* 1319 at Waterloo, *Curtis* *Scortichini* 100, 113, 340, in open jungle, Gopong, *King's Collector* 460 SINGAPORE *Ridley* 7595 at Rawang, *Goodenough* 10488

This species is very near indeed to *V. vestita* but differs in the much larger leaves and the prominent large bracts and calyx lobes.

14 *VITEX VESTITA*, Wall Cat 1750 (1928) A moderate-sized tree, branchlets rather slender, obscurely quadrangular, softly grey tawny-pubescent as are innovations. *Leaves* membranous, trifoliate, all three leaflets petioluled, the mid leaflet much the largest, leaflets elliptic or elliptic-lanceolate, long-acuminate at apex, the middle leaflet equally acuminate at base, the side ones rounded or acute with more or less unequal sides, the upper surface sparsely hispid and gland-dotted, the lower softly tawny-pubescent, villous on the nerves, also yellow-gland-dotted, margins entire, 3 to 7 in long, 1.5 to 4 in broad, midrib stout, main nerves 8 to 10 pairs, curving upwards to

and along the margin and joined by prominent rather irregular nervules and reticulations, petiole usually slender, 2 to 3 in long, petiolule of middle leaflet 1 to 1.5 in long, of side leaflets .25 to .5 in long. *Cymes* axillary, opposite, sessile, tawny pubescent, 1 to 1.5 in long, 2- to 3-chotomous, main peduncles usually 2, sometimes more, one above the other vertically, .25 to .5 in long, branches 2 to 3 chotomous, corymbose, spreading bracts minute, linear, caducous, pedicels slender, 0 to 1 in long, flowers yellow (*Kunstler*) (*calyx* campanulate, densely pubescent and gland dotted without, 1 to 1.5 in long, sub truncate or 2 lipped, enlarged and saucer shaped in fruit, lobes acute, short. *Corolla* tube slender, 2 lipped, narrow, cylindrical, 4 to 5 in long, glabrate without and with large yellow glands, glabrous within except for a villous ring about 1 in above the base and as far below the insertion of the stamens. upper lip shortly 2 lobed, lower 3 lobed, the midlobe slender, hardly longer than the others. *Stamens* included filaments glabrous, anther cells elongate, narrow, curved downwards each ending in an oblong empty appendage about half as long as the cell. *Ovary* densely covered with yellow glands, oblong, obtuse style slender. *Drupe* oblong 3 to 4 in long and .25 in broad, sparsely gland-dotted pyrene hard, reticulately ridged, with 3 to 4 fertile cells near the top and a large empty cavity below. *Seeds* obovoid, flattened, acute at base, .06 in long, testa thin cotyledons elliptic, fleshy, radicle small. *Schauer* in DC Prodr XI 692, Miq Fl Ind Bat II 864, Kuntz For Fl II 272. *Clarke* in Hook f Fl Br Ind IV 587. *V Finlaysonianae*, Wall Cat 6314.

PENANG *Wallich* 1750 B, *G King* at Penara Bukit, *Curtis* 265. PFRANK on Maxwell's Hill, *Wray* 699. *Kunstler* 176. SELANGOR at Bukit Kutu, *Goodenough* 10547. MALACCA *Griffith* (K D) 6063 (*uning* 2351. *Derry* 656, 899. JOHORE at Jaffaria, *G King*. SINGAPORE at Sungei Jeeroo, *Ridley* 3867, at Chenchukang, *Goodenough* 2792 — DISTRICT Burma, *Wallich* 1750 A. Sumatra, Borneo.

15. VITEX GAMOSEPALA, *Griff Notul* IV 178, and *Ic Pl Asiat* t 448, fig 2 (1854). A slender moderate sized tree, branchlets dark brown, prominently lenticellate, innovations fulvous hairy. *Leaves* chartaceous, trifoliolate, all three leaflets petiolulate, the mid leaflet somewhat the largest leaflets entire, ovate or lanceolate, long acuminate at apex, the side leaflets acute and slightly unequal at base, the mid-leaflet acuminate, both surfaces glabrate except on the nerves beneath, the lower glandular, brown when dry, the upper olivaceous, 3 to 7 in long, 1.5 to 2.5 in broad, midrib stout, raised beneath, main nerves 5 to 7 pairs, curving acutely upwards to and along the margin where they meet, joined by an irregular network of nervules, prominently

raised beneath when dry, petiole slender, terete, 2 to 4 in long, petiolule of mid-leaflet 75 to 1 in long, of side leaflets .25 in long. *Cymes* axillary, sessile, corymbose, sparingly fulvous-hairy, 2-chotomous below, 3-chotomous above, reaching 1.5 in long or more, bracts short, linear, caducous, pedicels slender, 0 to 1 in long, flowers pale yellow. *Calyx* 2 lipped, tube ovoid, 1 in long, densely glandular without as are the lobes, upper lip entire, oblong, .275 in long, lower lip 2-lobed, .075 in long, the lobes rounded, in fruit split on one side to the base and enlarged to a beaked shallow cup. *Corolla* funnel-shaped, tube .35 in long, with a ring of hairs within near the base, upper lip entire or shortly 2 lobed, lower 3-lobed, the middle lobe .125 in long, 2-fid, the side lobes .06 to .1 in long. tube and lobes, except the ends of the middle lobe of the lower lip which are usually incurved, all covered with prominent large shining yellow glands. *Stamens* exsert, anthers sparsely pilose near the base, cells elongate, parallel, each with a short empty beak. *Ovary* conical, densely glandular, style slender, glabrous, stigma shortly 2 lobed. *Drupe* obovoid, black, slightly glandular, fleshy, .3 in long, .25 in in diam, pyrene very hard, reticulately ridged, hollow at the base, the 3 to 4 cells near the top bearing seeds. *Seeds* oblong, beaked below, .05 in long, testa thin. cotyledons fleshy, convex, elliptic. radicle minute. Benth in Gen Pl II 1154, Clarke in Hook f Fl Br Ind IV 588

PERAK at Larut, *Scortechini* 445, 1480 in dense forest near Larut, at 500 to 1000 ft alt, *Kunstler* (*King's Collector*) 1841. SELANGOR at Kuala Lumpur and on Pahang road, *Ridley* 8546, 10218, 10479, *Curtis* 2366. MALACCA at Chin Rhingull, *Griffith* (K D) 6065, *Maingay* (K D) 1202. SINGAPORE at Changi, *Ridley* 2788

As pointed out by Clarke, this species in its inflorescence and corolla, and it may be added in its fruit, shows a great affinity to *T. vestita*. But the calyx distinguishes it at once, and the leaves differ a good deal. *Griffith's* fig represents the anthers only

VAR *Scortechini*, King & Gamble. *Cymes* shorter and few-flowered. *Calyx* much shorter, the upper lip only .075 in long, the lower .025 in with more acute lobes. *Corolla* similar, but middle lobe of lower lip entire and yellow glands much fewer and less prominent.

PERAK *Scortechini*, at Bujong Malacca, *Ridley* 9725, at Tapa Batang Padang, *Wray* 180, at lower camp, Gunong Batu Puteh, 3400 ft, *Wray* 992, 1080. NEGRI SEMBILAN at Seremban, *Ridley* 10096 — DISTRIB Sumatra (*Forbes* 3060)

VAR *Kunstleri*, King & Gamble. *Leaflets* ovate, acuminate at apex and base, 2 to 3 in long, 1 to 1.5 in broad, petiole 1 to 2 in long, petiolule of end leaflet .5 in, of side leaflets .25 in long. *Calyx* 2-lipped,

short, 1 in long, upper lip 0.75 in long, acute or rounded, often 2-lobed, lower lip acutely 2-lobed, the lobes 0.5 in long. *Corolla* tube slender, .45 in long, very glandular, upper lip shortly 2-lobed, lower lip 3-lobed, side lobes short, narrow, midlobe longer, obtuse. *Anther*-cells with a short rounded beak. Otherwise as in type.

PEPAK at Ulu Bubong, in open jungle at 400 to 600 ft, *King's Collector* 10605. TRINGGANU at Bunda, *Rostado* (Herb. *Ridley* 11982). —DISTRIBUTION Sumatra (*Forbes* 2685).

This is a well marked variety, but is not quite deserving of specific rank.

### Tribe III CARYOPTERIDEÆ

#### 11 PERONEMA, Jack

A small tree. Branchlets grey-tomentose. *Leaves* opposite, imparipinnate; leaflets subopposite, in several pairs, entire. *Inflorescence* of large compound, spreading, terminal, trichotomous panicles of corymbose cymes. *Flowers* very small, bracts small, setaceous. *Calyx* campanulate, 5-partite, not accrescent. *Corolla* tube short, limb 2-lipped, 5-lobed, the midlobe of the lower lip longer than the rest. *Stamens* 2, involute in bud, exserted; anthers broadly ovate-lanceiform with parallel cells. *Ovary* 4-celled, the cells 1-ovuled, style filiform, stigma entire or bifid, ovules attached laterally near the top of the placenta. *Fruit* a small globose capsule of 4 crustaceous valves, the valves separating from the base together with the adjoining portions of the central placenta. *Seeds* attached centrally near their top, pendulous, exalbuminous, testa thin, as are the cotyledons, radicle minute. —DISTRIBUTION One species, Malayan.

*PERONEMA CANESCENS*, Jack in *Mal. Misc.* II No. 7, 46 (1822). A small tree, bark grey, branchlets stout, grey, obtusely quadrangular, pith quadrangular. *Leaves* chartaceous, reaching 1 to 2 ft in length, pinnules 7 to 9 pairs, the upper pairs usually opposite, the lower subopposite or nearly alternate, the rachis winged, the wings narrow, from .05 to .25 in broad, petiole 2 to 7 in long, leaflets sessile, lanceolate, acuminate at apex, cuneate at base, gradually increasing in size upwards, from 1 in by .5 in at the base to as much as 9 in by .25 in at the tip, upper surface glabrous, lower puberulous, tawny-canescenscent, margins entire or serrate, midrib prominent, main nerves 20 to 30 pairs, regular, straight, joined by loops near the margin, reticulations netted. *Panicle* reaching 12 in in length and about 20 in in breadth, tawny-puberulous, peduncle stout, rachis quadrangular, lower branches opposite, long- (4 to 5 in) peduncled, ending, as the upper ones, in corymbose, many-flowered cymes, bracts scarcely 2 in long,

bracteoles very small, numerous, pedicels slender, very short, buds globose flowers white *Calyx* 1 in long, lobes acute, glabrous within. *Corolla* glabrous within, pubescent without, lower midlobe 15 in long, the rest 1 in. *Stamens* deflexed, filaments thickened towards the base. *Ovary* villous, as is the base of the style. *Capsule* densely tawny-pubescent, 125 in broad, 1 in long. Hook Comp Bot Mag I 152, Wall Cat 9075 Schauer in DC Prodr XI 627, Wight Ic t 1460, Griff Notul IV 177, Miq Fl Ind Bat II 909, Clarke in Hook f Fl Br Ind IV 599, Koord & Val Bijdr VII 214 *P. heterophyllum*, Miq Fl Ind Bat Suppl 570

PENANG Racecourse, Curtis 2427 PERAK at Ijuk, *Scortechinii* 1160 MALACCA (Griffith (K D) 6015 PAHANG Ridley 2247 SINGAPORE at Bukit Mandai, Ridley 3993 —DISTRIB Sumatra (*Teysmann*, *Forbes* 2655), Java, Borneo (*Motley* 870)

## 12 PTEROVITEX, Oliver

Shrubs usually climbing. *Leaves* opposite, simple or 3-foliate or bipinnate, petiolate. *Inflorescence* of terminal or axillary paniculate cymes with puberulous spreading branches, bracts subulate, flowers very small, shortly pedicellate. *Calyx* short, campanulate, much accrescent after flowering, the tube then long, and the lobes converted into oblanceolate scarious reticulate wings. *Corolla* oblique, 2 lipped the lobes obtuse, incurved at the tip. *Stamens* 4, subequal or didynamous, exsert or included, anthers oblong, cells parallel. *Ovary* obovoid, imperfectly 2 celled, cells 2 ovuled. ovules pendulous. style slender, stigma bifid. *Fruit* capsular, oblong or wedge shaped, exocarp thin. *Seeds* 2 (or 1 by suppression), attached to the central placenta, testa membranous. albumen none. cotyledons oblong or obovate, emarginate, fleshy. radicle thick, inferior. —DISTRIB About 3 species, native of the Malay Peninsula and Archipelago

Tawny pubescent, leaves 3 foliate, leaflets under 3 in long, capsule prominently ribbed

1 *P. Scortechinii*

Glabrous or very slightly puberulous, leaves 1 to 3 foliate, leaflets over 3 in long, capsule not ribbed

2 *P. bambusetorum*

1 *PTEROVITEX SCORTECHINII*, King & Gamble in Kew Bull 113 (1908) A shrub, perhap climbing, branchlets pale brown, somewhat angular, puberulous, innovations tawny pubescent. *Leaves* opposite, membranous, trifoliate, end leaflet ovate, shortly and obtusely acute at apex, rounded or slightly cuneate at base, 2 to 3 in long, 1 to 2 in broad upper surface minutely pubescent, lower grey pubescent, margins entire or undulate, main nerves 4 pairs, curving sharply upwards, side

leaflets similar but rather smaller and usually somewhat unequally cordate at base, petiole 1.5 to 2 in long, petiolule of end leaflet 5 to 7.5 in long, of side leaflets 2.5 in long, all pubescent. *Cymes* in axillary, tawny-pubescent, 3 or 2-branching panicles up to 6 in long, the upper most very short and few-flowered, bracts leafy, nearly orbicular, 5 to 7.5 in diam, pale, pedicels short. *Calyx* deeply-cleft, tawny pubescent, lobes 5 or 4, oblong or spathulate, 2.5 in long, fruiting calyx much enlarged, the tube 2.5 in long, enclosing the fruit, the 5 or 4 lobes expanded into elliptic oblong shining scarious lobes 7.5 to 1 in long, having 3 to 5 longitudinal nerves and prominent netted reticulation. *Corolla* very small (buds only available), 2-lipped lobes spathulate, concave, 1 to 1.5 in long. *Stamens* 4 exsert, 2 lower longer than the 2 upper, filaments short, anther cells of upper pair parallel, of lower slightly divaricate. *Ovary* cylindric, villous, obtuse at top, 2 celled, style short, stigma 2 lobed, the lobes spreading. *Fruit* capsular, oblong or wedge shaped, obtuse and pubescent at tip, 2 to 2.5 in long, exocarp chartaceous, striate. *Seeds* 2 (or 1 by suppression) cotyledons obovate, obliquely obtuse, emarginate, 1.5 in long, 1 in broad.

PERAK *Scortechini* 753 (or 1753 ?)

2. *PETRAOVITEX BAMBUSETORUM*, King & Gamble in Kew Bull 113 (1908). A creeper reaching 30 to 50 ft long and 2 to 3 in in diam (*King's Collector*), branches smooth, pale brown. *Leaves* opposite, chartaceous, 1 or 3-foliolate leaflets ovate, acuminate at apex, rounded or slightly cuneate at base 3 to 4 in long, 1.5 to 2.5 in broad, both surfaces glabrous margins entire main nerves about 8 pairs, straight to join a looped intramarginal nerve rather far from the edge, reticulations netted, raised, prominent beneath petiole 1 to 2 in long petiolules 2.5 to 5 in long, slender, the end one slightly the longest. *Cymes* in sessile or peduncled, thyrsoid, axillary, glabrous or puberulous panicles reaching 4 to 5 in long and about 3 in broad, rachis angular, very slender as are the branches and pedicels, bracts leafy, lanceolate, long-acuminate, bracteoles minute, setaceous, pedicels very short, buds ovoid. *Calyx* in bud very small, scarcely 0.5 in long, with triangular acute teeth, gradually enlarging later until in fruit it has a tube 2.5 to 3.5 in long and strongly ribbed, with oblong spathulate, membranous, shining lobes 4 to 5 in long and 1 to 1.5 in broad, the lobes prominently 3-nerved and reticulate. *Corolla* very small (buds only available), 2 lipped, the upper lip slightly 2 lobed, the lower deeply 3-lobed, all very small and glabrous. *Stamens* 4, subequal, filaments stout, anthers oblong with parallel cells. *Ovary* rounded, style short, stigma 2 lobed. *Fruit* capsular, wedge-shaped, slightly convex above, 3 in long, exocarp thin pubescent, not ribbed. *Seeds* 2 (or 1



by suppression), testa membranous, cotyledons obovate, truncate and slightly emarginate

PERAK in dense bamboo forests, at 500 to 700 ft, near Ulu Kerling, King's Collector 8765 — DISTRIB Borneo (Haviland 1913, Ridley 9065)

The Perak specimens are rather poor ones, with flowers in bud and very young fruit, and they have 3 foliolate leaves, while the Borneo specimen is unifoliate and in fruit, so that it is not quite certain that they belong to the same species, but after very careful examination we believe that they do, as the leaflets are identical and so are the nerves of the fruiting calyx

The genus *Pethaoulites* was founded by Prof D Oliver on *P. Riedelii*, Oliv, in Hook f Ic Pl V 15 t 1420 (1883), a plant sent from the Island of Buru by Mr Riedel, and remarkable for its bipinnate leaves

#### Tribe IV SYMPHOREMEÆ

##### 13 SPHENODESME, Jack

Climbing shrubs Leaves opposite, entire Inflorescence of capitate, 3 or 7 flowered, centrifugal cymes enclosed in an involucre of 6 foliaceous accrescent bracts, the cymes in pairs on the branches of large terminal or axillary, leafy, thyrsoid panicles Calyx ovoid campanulate, usually enlarging after flowering, lobes of 5 rather short teeth Corolla sub regular, tube short, cylindric, lobes 5, rarely 6, subequal, imbricate in bud Stamens 5, inserted in the tube of the corolla below the throat, included or exsert, anthers small, oblong or reniform, the cells parallel or divergent Ovary 2 celled, the cells 2 ovuled, ovules pendulous from the apex of the placentiferous axis, style filiform, short or long stigma 2 lobed Drupe globose or obovoid, included in the calyx, 1 seeded or rarely 2 seeded exocarp leathery Seed globose, entirely filling the cavity or its lower part, the placentas included within the cotyledons testa membranous, cotyledons thick, very fleshy, radicle very small, inferior — DISTRIB About 10 species, in India, Malaya and the Malay Archipelago

Corolla lobes long narrow, style very short, anthers included in the corolla tube (Sect 1 BRACHYNEMA, Griff)

1 *S. ferruginea*

Corolla lobes ovate or oblong, broad, style long, exsert, anthers exsert (Sect 2 EUSPHENODESME, C B Clarke) —

†

Flower heads 3 flowered, the 6 bracts small in flower, enlarged in fruit, branchlets and leaves glabrous or nearly so ..

2 *S. triflora*

Flower heads 7 flowered the 6 bracts enlarged both at flowering time and in fruit —

Branchlets leaves and inflorescence rufous hirsute, calyx very hirsute ..

3 *S. barbata*

Branchlets, leaves and inflorescence sparingly pubescent or glabrate, calyx nearly glabrous

4 *S. pentandra*

1 SPHENODESME FERRUGINEA, Buquet in Engl & Prantl Pflanzenfam IV 3A, 181 (1894) A shrub, probably climbing, branchlets and inflorescence rusty stellate-tomentose, branchlets obscurely quadrangular. *Leaves* chartaceous, ovate or elliptic, acute at apex, cuneate or obtuse at base, sparsely hispid pubescent on the upper surface, especially on the nervos, softly ferruginous tomentose on the lower, 3 to 5.5 in long, 2 to 3.5 in broad, midrib stout, main nervos 5 to 6 pairs, the lowest pair from close to the base, the next about 2 in above it, both nearly straight to the margin and then along it, the rest curved to meet in a looped intramarginal nerve, transverse nervules irregular, petiole stout, 2.5 in to 5 in long. *Panicles* axillary or terminal, spreading, leafy, densely covered with tawny-yellow tomentum, the whole forming a thyrse 12 in or more in length and about as broad, peduncles 2 to 3 in long, 3 or 5 dichotomous, the two lower branchlets short peduncled with each a pair of capitate heads, the two upper long peduncled and again branching, heads 7 flowered supported by 6 spatulate bracts 7.5 in long and 2.5 in broad buds obovoid, flowers sessile. *Calyx* tubular, densely stellate tomentose without, whitish villous within, 2.5 in long, 2 lipped, the lips variably lobed, usually the upper 2 lobed rather deeply cleft, the lower very minutely 3 toothed. *Corolla* tube funnel shaped, slightly curved, 3 in long, tomentose without densely villous within, lobes 5-6 or 7, 2 in long, linear or ligulate, twisted. *Stamens* included, inserted low down on the corolla-tube usually some what irregularly but generally in 2 to 3 rows, if 3 rows. and 7 stamens the upper row 3, the middle 2 the lower 2 these latter close to the base, filaments slender glabrous, about 1 in long anthers reniform. *Ovary* columnar, glabrous, style extremely short stigma very shortly bifid. *Fruit* not known. *S. microstylis*, Clarke in Hook f Fl Br Ind IV 600. *Brachynema ferruginea*, Griff Notul IV 176.

SIAMSF SIATES Pungah, abundant! (Witts 2963, Tongka, vide Curtis) —DISTRIB Burma (Moulmein & Mergui, Griffith (K D) 6007, in part, Tavoy, Parish), Siam (Morton 62)

The curious arrangement of the stamens inside the corolla tube and the very short style are such well marked characters that it would almost seem advisable to reconstitute the genus *Brachynema*, or else to bring together into one genus of 4 sections *Sphenodesme* with *Symphorema* and *Congra*. We are inclined to consider the latter the best course, but it should be done in discussing a Monograph of the tribe rather than the few species found in a limited area.

2 SPHENODESME TRIFLORA, Wight Ic t 1478 (1850) A climbing (sometimes erect, *Kunstler*) shrub, branchlets dark brown, terete, rough with many small lenticels, a slight ring at the nodes. *Leaves*

chartaceous, lanceolate, bluntly acuminate at apex, cuneate at base, glabrous on both surfaces or the younger ones slightly velutinous, 3 to 5 in long, 1 to 2 in broad, midrib prominent beneath, main nerves 5 to 6 pairs, the lowest pair very inconspicuous, close to the margin, the next at about 25 in from the base and 40° with the midrib, curving up to and along the margin, but not meeting the remaining 3 to 4 which curve at about 50° and meet in intramarginal loops, transverse nervules arched, reticulations netted, petiole 25 to 5 in long, curved *Panicles* very long, grey-pubescent, the lower branches leafy with ordinary leaves, the upper ones with gradually smaller leaves becoming bract-like, the branches very long, up to 2 ft, slender, scarcely 1 in broad, bearing distant opposite pairs of 3-flowered capitate cymes each supported by a pair of reduced leaves and furnished with 6 spatulate bracts usually longer than the flowers and enlarging in fruit, flowers sessile, the corollas dark purple, the calyx and bracts dull red *Calyx* tubular, 10 nerved, velutinous pubescent without, densely villous within 1 to 15 in long, lobes 5, triangular, short *Corolla* puberulous, tube cylindric, with a ring of hairs near the mouth within, 25 in long, lobes 5, subequal, rounded *Stamens* shortly exsert, filaments slender, anthers reniform, the cells somewhat divergent *Ovary* pyriform, glabrous style slender *Drupe* ovoid or obovoid, sometimes constricted above, included in the enlarged prominently ribbed calyx, and supported by the 6 oblong spatulate glabrescent enlarged bracts, which reach 5 to 75 in long and 15 to 3 in broad, and have 3 prominent nerves joined by transverse nervules, exocarp leathery *Seed* 1, globose, completely filling the lower part of the cavity of the drupe, the upper part empty, cotyledons 1 in in diam, including between them the remains of the placenta Griff Notul IV 182, Miq Fl Ind Bat II 910, Clarke in Hook f Fl Br Ind IV 61 *Congea Jackiana*, Wall Cat 1735, partly

PERANG at Ayer Etam, 1000 ft, *Curtis* 210 PERAK at Tapa and Jenah, *Wray* 683, 1383, 1752, at Gunting Bidai, *Ridley* 7598, at Salam, *Scortechini* 1119 in open jungle up to 500 ft, *Kunsiler* (*King's Collector*) 160, 1098, 1623, 2474 SELANGOR Semangko Pass, *Ridley* 12086, 12088 MALACCA *Griffith* (K.D.) 6009, 1, *Maingay* (K.D.) 1196, at Sungai Udang, *Derry* 585 JOHORE at Bukit Kayara, *Ridley* 11347 SINGAPORE Kampar jungles, *Deschamps* —DISTRIB Sumatra (*Forbes*, 3083)

3 SPHENODESME BARBATA, Schauers in DC Prodr XI 623 (1847) A climbing shrub, branches dark brown, rough, lenticellate, innovations, branchlets and inflorescence patently rufous-hirsute *Leaves* chartaceous elliptic or elliptic-oblong or elliptic-lanceolate, suddenly and

obtusely acuminate at apex, also mucronate, acute or somewhat rounded at base, sparsely tawny villous on both surfaces when young, glabrescent when old except on the nerves, 2 to 4 in long, 1 to 1.5 in broad midrib conspicuous, ending in the mucro, main nerves 5 to 6 pairs, the lowest pair almost from the base the next a little higher up, the rest more distant, curving to join in an intra-marginal nerve transverse nervules few but prominent, petiole 2 to 3 in long, twisted. *Panicles* in terminal racemes of heads or in single or few pedunculate axillary pairs of heads, the heads 7-flowered, each with 6 spatulate bracts reaching 7.5 in long and 2.5 in broad and prominently veined, peduncles 5 to 1.5 in long very slender flowers sessile, corolla blue. *Calyx* campanulate, 1.5 to 2 in long, densely long rufous hirsute with out, lobes 5, short, triangular, each with often 1 or 2 subsidiary shaggy teeth. *Corolla* tube cylindric, 1 in long, glabrous below villous in a ring at the throat within lobes subequal, 1.25 in long oblong spatulate, pubescent without. *Stamens* inserted in the throat of the corolla tube exert filaments slender, glabrous anthers oblong cells parallel. *Ovary* rounded densely villous style slender as long as stamens stigmatic lobes 2 very short. *Drupe* small globose or ob-ovoid included in the enlarged calyx ferruginous villous exocarp crustaceous. *Seed* 1, globose completely filling the cavity of the drupe, testa very thin cotyledons thick, 0.5 to 1 in in diam. Wight Ic 1474 (*ferruginea* R. W. in fig 7) Miq Fl Ind Bat II 910 Clarke in Hook f Fl Br Ind IV 601 *Congea barbata*, Wall Cat 1738

PERANG *Wallach* 1738 at Tulloh Bahang, *Curtis Phillips* MALACCA *Griffith* (K D) 6009 2 *Mangay* (K D) 1194 *Hervey*

4 SPHENODLISME PENIANDRA, Jack in Mal Misc I 19 (1820) and in Hook Bot Misc I 285 (1830) A climbing shrub branchlets obscurely quadrangular, lenticellate pubescent dark brown. *Leaves* subcoriaceous, elliptic oblong, ovate or lanceolate, bluntly acute or acuminate often mucronate at apex, rounded at base both surfaces glabrous when old, the upper shining, the lower pubescent when young the nerves beneath generally pubescent, 2 to 7 in long 1 to 2.5 in broad midrib stout, main nerves 7 to 8 pairs, the lowest very thin and close to the margin, the next a little above, curving to and along the margin almost to the tip, the rest more distant, curving to meet in a prominent looped intra-marginal nerve, transverse nervules many, nearly at right angles to the midrib, reticulations netted, prominent, petiole 2.5 to 5 in long, pubescent, channelled, curved. *Panicles* axillary and terminal, many flowered, somewhat puberulous, often racemose leafy and reaching 6 to 15 in in length the capitate heads in opposite pairs on slender 5 to 7.5 in

long peduncles, flowers in each head 7, supported by 6 oblong-spathulate, obtuse, nearly glabrous, bracts .75 to 1.25 in. long, .25 to .35 in. broad, and with about 6 prominent nerves and reticulations; flowers blue or purple with a yellowish calyx and pale yellow bracts. *Calyx* campanulate or funnel-shaped, usually prominently 10-ribbed, nearly glabrous, .25 in. long, when young with 5 short lobes and a mucro in the angles between them, when old with 5 prominent acuminate aristate lobes, and 5 aristate teeth in the axils, reticulately nerved in the upper half. *Corolla* tubular, the tube .2 in. long, densely villous within in the upper half, glabrous in the lower, lobes leathery, rounded, .05 to .1 in. long, obscurely in 2 lips, the midlobe of the lower lip recurved, the rest spreading. *Stamens* 5, inserted a little below the mouth of the corolla-tube, long-exserted, filaments slender, anthers oblong, the cells parallel. *Ovary* densely tawny-villous, style very long, slender, stigmatic lobes 2, spreading. *Drupe* the size of a pea, globular (Roxb.) *Seed* 1, conform to the drupe, cotyledons unequal. *Wight* Ic. t. 1475 (*S. Wallichiana*, Schauer in *letterpress*), Griff. Notul. IV. 181, Clarke in Hook. f. Fl. Br. Ind. IV. 602; Briquet in Engl. & Prantl Nat. Pflanzenfam. IV. 3A, 181, fig. 67 E, F. *S. Wallichiana*, Schauer in DC Prodr. XI. 622. *S. Jackiana*, Schauer l. c., Miq. Fl. Ind. Bat. II. 299. *S. acuminata*, Wight Ic. t. 1476 (*S. Jackiana*, Schauer in *letterpress*). *Roscoeia pentandra*, Roxb. Fl. Ind. III. 54. *Congea pentandra* and *Jackiana*, Wall. Cat. 1734, 1735. *C. azurea*, Wall. Cat. 1733, partly. *Symphorema Jackianum*, Kurz For. Fl. II. 255.

JUNBEYLON or TONGA *Curtis* KEDAH: Coah on Langkawi Island, *Curtis* 2522, *Ridley* 8320. PENANG: *Wallich* 1735, 1, *Curtis* 269. PROVINCE WELLESLEY at Krian, *Ridley* 9391. PERAK *Scortechini* 519, *King's Collector (Kunstler)* 3100, 4532, 7691, 10642. MALACCA *Griffith*, *Maingay* (K.D.) 1195, *Cunning* 2388, *Derry* 40. PAHANG: *Ridley* 2160. JOHORE at Bukit Songa, *Ridley* 11122.—DISTRIB. India (Assam, Khasia Hills, Burma), Borneo:

#### 14. CONGEA, Roxb.

Large climbing shrubs, usually tomentose with mixed simple and stellate hairs. *Leaves* opposite, entire. *Inflorescence* of pedunculate, capitate, 3- to 9-flowered, involucrate cymes in large terminal panicles; the bracts at the base of the peduncles leaf-like, often white or coloured; the involucre of 3 or 4 elliptic or oblong or spathulate bracts connate at the base. *Calyx* tubular, funnel-shaped, slightly accrescent, 5-toothed. *Corolla*-tube slender, widening upwards, glabrate without,

usually villous within, 2 lipped, the upper lip of 2 lobes, the lower of 3, those of the upper lip the largest. *Stamens* 4 didynamous, inserted in the throat of the corolla, exsert, anthers oblong, the cells parallel. *Ovary* imperfectly 2 celled, 4 ovuled, ovules pendulous from the apex of the central placenta, style filiform, shortly bifid. *Drupe* small, obovoid, nearly dry, 1-seeded. *Seeds* conform to the drupe, testa membranous, cotyledons fleshy, unequal, enclosing the remains of part of the placenta, radicle very small, inferior. —*DISTRIB* Four species, of Burma and Malaya.

Clarke in Fl Br Ind says the drupes are 4 seeded, but every specimen we have examined affords one seed only, accompanied by the remains of the placenta and of 3 abortive ovules.

Involucral bracts reaching 1.5 in. by .75 in. white tomentose, leaves beneath and inflorescence more or less ferruginous villous, and with about 5 to 6 pairs of main nerves ..

1 *C. testata*

Involucral bracts reaching 1.25 in. by .3 to .4 in. pale lilac tomentose leaves beneath and inflorescence softly tomentose and with about 4 pairs of main nerves

2 *C. tomentosa*

1 *CONGOLA VESPERTINA*, Griff. Notul. IV 174 and Ic Pl. Asiat. t. 458, fig. 21 (1854). A large climbing shrub, branchlets patently fulvous hirsute, striate. *Leaves* submembranous, ovate or elliptic sharply acute at apex obtuse or shortly cordate at base upper surface scabrous pubescent, ferruginous villous on the nerves lower villous and grey tomentose. 3 to 7 in. long, 1.5 to .3 in. broad midrib slightly impressed above main nerves about 5 to 6 pairs, curving upwards to and along the margin, transverse nervules many, but, like the reticulations, obscure, petiole .25 to .5 in. long, with long tawny hispid hairs. *Panicles* very large, bracts leaf-like, whitened, involucral bracts 4, very slightly connate at base, elliptic obovate often bifid at apex, reaching 1.5 in. long by .75 in. broad, densely white tomentose, with prominent reticulations and 3 pairs of main nerves, flowers rose-coloured. *Calyx* funnel-shaped, ribbed, .25 to .35 in. long, densely white-villous without and within, teeth 5, triangular, acuminate. *Corolla* tube slender below, gradually widening upwards, .3 to .35 in. long, glabrous without, also within except a thick villous ring below the throat, upper lip of 2 ovate-oblong erect or recurved lobes, lower of 3 lobes half as long as the upper, the side lobes erect, the third lobe decurved, all thin, glabrous, with brown nervules. *Ovary* oblong-obovoid, glabrous except a few glands at the tip. *Drupe* nearly dry, obovoid. Clarke in Hook. f. Fl. Br. Ind. IV 603.

PROVINCE WELLESLEY Arakuda woods, Ridley 6993.—DISTRIB. Tenasserim

2 CONGLA TOMENTOSA, Roxb Cor Pl III 90 t 293 (1819). A large climbing shrub, branchlets densely tawny-tomentose. Leaves coriaceous, ovate, acute at apex, rounded at base, upper surface glabrous except on the nerves, lower tawny tomentose, 2 to 4 in long, 1 to 2.5 in broad, midrib stout, main nerves about 4 pairs, curving upwards, joined by many regular transverse nervules, petiole tawny-tomentose, 2.5 in long. Panicles terminal, reaching about 6 in long and 9 in broad, 3-chotomous, densely tawny tomentose, branches long-(2 to 2.5 in) peduncled, racemose, bearing pairs of heads on 5 in long peduncles, bracts leaf-like, caducous, involucrial bracts 4 to each head, pale lilac, ovate or spatulate, slightly emarginate, densely tomentose, 7.5 to 12.5 in long, 3 to 4 in broad, with 4 to 5 pairs of main nerves. Calyx funnel shaped, densely villous especially within, 2.5 in long, teeth 5, .05 to 1 in long, triangular. Corolla tube slender, slightly longer than calyx, glabrous except a ring of villous hairs at the throat within, 2 lipped, the upper lip long deeply bifid, the lower of 3 short lobes, the midlobe the longest. Stamens long-exsert. Ovary obovoid pyriform, glandular at tip, style very slender, stigmatic lobes 2. Drupe obovoid, nearly dry, exocarp crustaceous, smooth. Seed 1, nearly filling the cavity of the drupe, with 3 abortive ovules, testa very thin, cotyledons thick, unequal, somewhat emarginate. Wight Ic t 1479, 2 or 1565, Schauer in DC Prodr XI 623, Kurz For Fl II 256 Miq Fl Ind Bat II 911 Clarke in Hook f Fl Br Ind IV 603 *Roscoea tomentosa*, Roxb Fl Ind III 57 *Calochlamys capitata* Presl Bot Bernerk 149

SOUTH WEST SIAM at Poongah, Curtis 2903, 2962 —DISTRIB India (Chittagong), Burma, Siam Often cultivated

The involucrial bracts of our specimens do not agree very well with those figured in the Coromandel Plants, but they agree better with the authentic specimens. We have not been able to make quite sure whether our specimens belong to type *tomentosa* or to the var. *azulica* ( *azulica*, Wall Cat 1733), but we think to the latter.

The following species seems worthy of description here, as possibly also occurring in the Peninsula

CONGLA FORRESTERII, King & Gamble in Kew Bull 114 (1908). A large climber, spreading over great forest trees, branchlets rather slender, hoary pubescent. Leaves chartaceous, oblong or oblong lanceolate shortly acuminate at apex, rounded and slightly cordate at base, upper surface shining, glabrous except the puberulous nerves, lower surface softly pubescent, reddish brown when dry, 3 to 5 in long, 1 to 1.5 in broad, midrib strong, impressed above, as are the 5 to 6 pairs of main nerves which start at about 30° with the midrib and curve upwards to and along the margin, transverse nervules many, horizontal, reticulations netted, petiole 2 in long, tawny pubescent. Panicles terminal, tawny pubescent racemose reaching about 12 in in

length and 6 in in breadth, main branches usually 1 pair only, with slender 1 to 1.5 in peduncles, heads in pairs on short (2 to 3 in long) peduncles, the pairs 1 to 2 in apart along the raceme bracts leafy, coloured, involucre bracts 4 grey tomentose oblong spatulate, 1 to 1.5 in long, 4 in broad within them a pair of linear setaceous bracteoles about 3 in long, flowers light purple. *Calyx* tubular funnel shaped, densely villous on both sides but especially within 3 in long, teeth triangular 0.75 in long, acute. *Corolla* tube cylindric slender, 3 in long glabrous except the ring of villous hairs at the mouth within, 2 lipped the upper lip of 2 lobes longer than the 3 lobes of the lower margins of the lobes crenulate. *Ovary* obovoid glabrous except a few glandular dots at top, style very slender. *Drupe* obovoid dry, exocarp crustaceous smooth tipped with the persistent base of the style. *Seed* 1 with the remains of the placenta and 3 abortive ovules testa extremely thin membranous, cotyledons unequal one concave the other convex, fleshy 120 in in diam the apex depressed radicle very small.

SUMATRA in deep forest Lampongs *Indes* 1567

# Tribe V AVICENNIFÆ

## 15 AVICENNIA, Linn

Shrubs or small trees with long creeping roots which give out at intervals narrow conical leafless suckers. *Leaves* coriaceous opposite, entire. *Flowers* small sessile in capitate pedunculate heads of close centripetal cymes which are in pairs in the upper axils or in short terminal trichotomous thyrsi or corymbs bracts small, shorter than the calyx. *Calyx* short 5 partite, unaltered in fruit segments ovate concave, deeply imbricate. *Corolla* tube short cylindric lobes 4, subequal or the posterior lobe slightly the largest. *Stamens* 4, inserted on the corolla throat, filaments short, anthers shortly exsert cells ellipsoid, parallel. *Ovary* imperfectly 4 celled by a 4-winged central axis ovules 4, pendulous between the axial wings style tapering stigma bifid. *Fruit* a compressed capsule dehiscent by 2 leathery valves. *Seed* solitary, erect, embryo imperfectly covered by the 2 integuments, albumen none, cotyledons large, longitudinally plicate, the radicle inferior, thick, villous, the plumule conspicuous, developing before the seed falls.—DISTRIBUTION Muddy estuaries and sea-coasts of the warmer regions of the globe, species 4 or 5.

Leaves obtuse at apex, capsule over 1 in long, corolla tube distinct, stamens exsert, style long

1 *A. officinalis*

Leaves acute or acuminate at apex, capsule under 1 in long, corolla tube almost none, stamens included, style very short

2 *A. alba*

1 AVICENNIA OFFICINALIS, Linn Sp Pl 110 (1753) A small tree with greyish-brown thin bark and many blind root-suckers, branchlets pale brown, subquadangular, glabrous when old, young ones, young leaves and inflorescence with very close pale tomentum. *Leaves* coriaceous, elliptic oblong or obovate, obtuse at apex, attenuate at base, upper



surface glabrous, smooth and shining, lower surface pale and with a hard, very thin, grey or tawny tomentum, at length glabrate, 2 to 4 in long, 1 to 2 in broad, midrib stout, very prominent, main nerves 6 to 8 pairs, at first straight, then curving to anastomose near the margin, reticulations netted petiole stout, 25 to 75 in long *Flowers* sessile, in small heads on rigid angular peduncles either 2 together in upper axils or several in short terminal thyrsi, bract and 2 bracteoles concave thick, shorter than the sepals, flowers in each head 3 to 6, corolla orange yellow *Calyx*-segments thick, 1 to 3 in long, ovate or suborbicular, scarious ciliate on the margins, the lower part of the back pubescent, the rest glabrous *Corolla* tube very short, cylindric, lobes 4, ovate, acute or rounded at tip, subequal, 2 in long, pubescent without, nearly glabrous within *Stamens* exserted, filaments 1 in long, anthers 0.5 in long cells parallel, ellipsoid *Ovary* conoidal, tapering into the style, together 2.5 in long stigmatic lobes curved *Capsules* 1 to 1.5 in long ovoid, compressed, beaked, green with greyish tomentum *Seed* 1, completely filling the capsule Schauer in DC Prodr XI 700, Bodd For Man in Fl Sylv CLXXIV, and Anal Gen t 22, fig 2, Brandis For Fl 371 Trimen Fl Ceyl III 363, Clarke in Hook f Fl Br Ind IV 604 Miq Fl Ind Bat II 912 Koord & Val Bijdr VII 217 Cooke Bomb Fl II 435 Plain Beng Plants 838 *A. resinifera* Forsk Dene in Nouv Ann Mus III 402 *A. tomentosa* Br Prodr Flor Nov Holl I 518 Roxb Fl Ind III 88 Wall Pl As Rii III 44 t 271 Wight Ic t 1481 Blume Bijdr 821 Griff Notul IV 185 Kunz For Fl II 276 *Halodendron Thouarsii*, Roem & Sch Syst III 485 *Mangium album* Rumph Herb Amb III t 76 *Oepata* Rhoeoe Hort Mal IV t 45

PINANG Wallich 1742 Curtis 3533 MALACCA Griffith (K D) 6069, Mangay (K D) 1208 SINGAPORE T Anderson 79 River valley road, Ridley 10370 Hullett 163 —DISTRIBUTION Coasts of India Ceylon, Burma, Java eastwards to the Pacific in tidal creeks and on muddy coasts

2 *AVICENNIA ALBA* Blume Bijdr 821 (1826) A shrub or small tree branchlets pale brown, shining, obscurely quadrangular, innovations and inflorescence shortly appressed, whitish or tawny tomentose *Leaves* coriaceous, lanceolate, acute or acuminate at apex, attenuate at base, glabrous on both surfaces or whitish-tomentose beneath (especially when young), 2 to 5 in long, 7.5 to 2 in broad, midrib prominent, main nerves 8 to 10 pairs, curving upwards to anastomose near the margin, secondary nerves few, meeting few arched transverse nervules, all somewhat raised on the upper surface, petiole thick, 2.5 to 5 in long *Flowers* sessile, either in small capitate heads or in distichous spikes in short terminal or axillary panicles, rachises and peduncles

angular, bract and 2 bracteoles concave, thick, shorter than the sepals, the bract orbicular, ciliate, the bracteoles ovate, ciliate, acute. *Calyx*-segments thick, 1 in long, ciliate, slightly pubescent on the back near the base, above glabrous and rugose. *Corolla*-tube very short, sometimes almost none, lobes 4, ovate, concave, acute at tip, the posterior one sometimes bifid, 1 in long, glabrous. *Stamens* included, filament 0.3 in long, anthers 0.2 in long, oblong cells parallel. *Ovary* columnar, with very short conical villous style, together 0.5 to 1 in long, stigmatic lobes 2, erect, thick, minute. *Capsules* 5 to 7.5 in long, obpyriform, gibbous on one side, acute or acuminate, pericarp green (*Kunstler*) with greyish tomentum. *Seed* 1, completely filling the lower part of the capsule. *Wight* Ic t 1482. *Miq* Fl Ind Bat II 913, *Cooke* Bomb Fl II 436, *Koord & Val* Bijch VII 221, *Prairie* Beng Plants 838. *A. officinalis*, *Linn*, var *alba*, *Cluke* in *Hook* f Fl Br Ind IV 604. *A. resinifera*, *Griff* Notul IV 186, and in *Trans Linn Soc* XX 6, fig 1. *A. intermedia*, *Griff* l c. *A. officinalis*, *Kun* For Fl II 275.

PROVINCE WELLESLEY in mangrove swamps (*Wright*). DINDINGS Pangkore, *Scortchinn* 963. MALACCA *Griffith* (K D) 6070, 6071. *Mammy* (K D) 1209. SINGAPORE *Kunstler* (*King's Collector*) 1152. —DISTRIBUTION India, Borneo, Java, Borneo, Celebes, to North Australia, in tidal creeks.

*Koorders & Valton* draw attention to the capitulate heads shown in *Wright's* drawing, and refuse to quote t 1482. We have seen *Koorders* Nos 9696 and 22009 from Java which have the heads spicate, as do *Kunstler's* specimens no 1152. Hawaiian & Borneo specimens are partly spicate partly capitulate. *Scortchinn's* Pangkore specimens are capitulate. But in all the structure of the flowers is the same and agrees with that given in *Wright's* drawing so there seems no room for even a variety.

## ADDENDA-CORRIGENDA.

## VOL. LXXII II. PART No. 14 (1903).

Page 113, line 21, for "inner" read "upper"

P. 114, l. 7, for "ovate" read "obovate"

P. 117, omit the whole of lines 7, 8 and 9

P. 152, l. 4 from below, for "PERAKENSIS" read "PERAKENSE"

Pages 187, 188, omit the whole of 19, TRISCIADIA, Hook. fil.

## VOL. LXXIII II PART No. 15 (1904)

P. 51, l. 23, after "Walluch" insert "PERAK Wray 2104, 3271, Scortechini, Ridley 8374, King's Collector 5508, 6431, 6545 —DISTRIB. Andaman Islands, Sumatra, Java, Forbes 2504"

P. 51, l. 11 from below, before "flowers" insert "greenish-white"

P. 52, l. 25, after "Flowers" insert "white, sweet-scented,"

P. 57, at top of page, insert "34. KNOXIA, Linn."

„ „ l. 3 from below, before "CANTHIUM" insert "35"

P. 59, l. 11 from below, for "Fruit when ripe . . . glabrous" read "Fruit oblong, obovoid, 1 in long, yellow, pulpy, acid in taste."

P. 60, l. 20, for "Fruit unknown" read "Fruit black when ripe."

„ „ l. 5 from below, after "Fruit" insert "orange,"

P. 62, l. 20, for "my" read "our"

P. 64, l. 12, after "Flowers" insert "rosy-white, nearly 1 in. in diam.,"

P. 66, l. 2, after "bracteolate" insert " , flowers green "

P. 67, l. 13, after "Flowers" insert "white,"

„ „ l. 7 from below, after "calyx," insert "flowers white"

P. 68, l. 16, after "pubescent" insert " , flowers white."

„ „ l. 2 from below, after "bracteoles" insert " ; flowers white."

P. 69, l. 18, after "base" insert " , flowers white "

„ „ l. 4 from below, after "bracteolate" insert " , flowers white."

P. 70, l. 15, after "linear" insert " , flowers white."

P. 73, l. 3, after "bract" insert " , flowers white."

„ „ l. 9 from below, after "Flowers" insert "red,"

P. 74, l. 22, after "long" insert " , flowers white."

P. 75, l. 3, after "persistent" insert " , flowers white."

„ „ l. 5 from below, after "tube" insert " , flowers scarlet."

P 78, l 8, before "smaller" insert white and

P 79, l 6, after "shorter" add —

"Mr. Ridley says this variety is *I stenophylla* Ridl in Trans Linn Soc Ser 2, III 311 (1993) at any rate so far as the Pahang plant is concerned, he considers it a good species "

P 79, l 5 from below after 'minute' insert "flowers orange

P 80, l 5, for "SCORTICHINI" read "SCORTICHINI

„ „ l 15, after "puberulous" insert "flowers red

„ „ l 12 from below, after minute insert "flowers red orange or yellow"

P 81 l 24, after "minute" insert flowers orange red

P 88, l 7 from below after common insert "sea shore plant

P 89, l 3 from below, after "flowers" insert violet,

P 91, l 8, after long add

"Mr Ridley thinks it is a new species of *Limonium*

P 94, l 9, after "Flowers" insert pink

„ „ l 5 from below, after "Flowers" insert "white

P 95, l 8 omit "S longicaulis, Br in Wall Cat 826

„ „ l 20, after "Flowers" insert "white,

P 102, after line 12 add as note —

"Mr Ridley remarks the occurrence of *Mymecodia echinata* Gaudich which is not rare near the sea—PAHANG Ridley 1462 SINGAPORE Ridley 5869 8067

P 105, l 21, after "pedicels" insert "white bracts purple

P 106 l 7, after long insert ochre yellow honey scented and at line 11 after "Fruit" insert bright light blue,

P 111, l 20, for lucidas read Louianus

P 132, l 3 from below for "LUCIDUS" read "LOWIANUS

P 134, l 15 for "BC" read Blume

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P 4, l 8, for "Scandent" read "Erect

P 5, l 12 from below, after "Fruit" insert "white, fleshy,

P 6, l 5, after "Fruit" insert "white,

P 8, l 23, for "climber" insert "plant, creeping on tree stems, often

„ „ l 6 from below, after "Fruit" insert "white, showy,

P 37, l 20, after "obtus" insert "flowers lavender coloured

P 39, l 2, after "24" insert "Hook f Fl Br Ind III 336 " line 3, for "Calcalia" read "Cacalia" and line 4 for "El" read "C"

P 48, at the end of Order LXI COMPOSITÆ, add —

“Since the description of this Family was written, the following species have been noticed as additions to the Flora

#### Tribe VERNONIÆ

*Sparganophorus Vaillantii*, Gaertn Fruct II 396 t 165 A road-side weed, introduced from the West Indies, common in Singapore — *Ridley, Deschamps*

*Vernonia eleagnifolia*, DC Prodr V 22 At Pekan, Pahang, fide *Ridley*

#### Tribe ASTEROIDEÆ

*Erigeron limifolius*, Willd Sp Pl III 1955 An escape or garden weed, common — Penang, *Curtis* 3389, 3401

*Gnaphalium nuderaspatana*, Poir , DC Prodr V 373 Kedah, *Curtis* 3809

#### Tribe INULOIDEÆ

*Blumea myriocephala*, DC Prodr V 445 Selangor, *Curtis*, 2350

*Cresulia arillaris*, Roxb Hort Beng 62, fide *Ridley*

#### Tribe HELIANTHOIDEÆ

*Enhydra fluctuans*, Lour Fl Cochinch 511 Penang, *Curtis* 3455

*Acanthospermum xanthioides*, DC Prodr V 521 An introduced weed in Singapore, fide *Ridley*”

P 49, line 13, after “Flowers” insert “bright mauve,”

P 53, l 10, for “purple” read “pale blue”

P 54, l 24, for “adnatus” read “adnatum”

P 55, l 5 from below, omit “SINGAPORE, Lobb”

„ „ lines 4 to 2 from below, omit “Ridley (Trans Linn Soc, & common”

P 56, l 14 from below, for “Sahan” read “Tahan”

„ „ l 4 from below, for “marcescent” read “accrescent”

P 58, l 19, at beginning insert “PROVINCE WELLESLEY common”

P 61, l 23, for “microphylla” read “microphyllum”

P 64, l 13 from below, for “white” read “pink”

P 66, l 11, after “shrub” insert “or small tree or an epiphyte on lofty trees”

P 66, l 14, after “paler” insert “often bright red when fresh”

„ „ l 22, after “Corolla” insert “pink or white,”

P 67, l 29, after “long” insert “, pink, fragrant,”

„ „ l 7 from below, after “Fruit” insert “black, edible,”

P 72, at the end of DIPLYCOSIA add note —

“ *D. lanceifolia*, Ridley in Journ Str Br R As Soc No 89, 15 (1903) from Gunong Benom in Pahang, has been omitted ”

P 91, at end of GENTIANACEÆ add note —

Ridley says that *Lxacum tetragonum* *P. racum pedunculatum* and *Canscora diffusa* only admitted on the authority of Lobb's specimens which are of very doubtful locality, ought probably to be excluded. He would add *Limnanthum c. statum*, Griseb found at Singapore and at Batu Pahat river, Johore

# PART No 17 (1905)

Page 123, line 5, after “ *Berry* ” insert “ white,

P 131, last line, after “ 1808 ” insert “ SINGAPORE Changchukang, Ridley 3653, 3844 (*vide* Ridley)

P 171, line 28 after “ 101 ” insert “ Regensb Fl 578 (1855) Walp Ann V 475 *Ceratophorus Lecrin*, and line 31 for King's Collector read “ Wray

P 175, l 26, for ‘ (?) ’ insert “ about 20 feet high ” and last line before “ *Ridley* ” insert “ in the Bukit Kutu woods,

P 191, l 10, after 60 insert “ to 80 ” and for 10 to 15 in read “ 3 to 4 feet

P 193, ll 18, 19, for —

‘ It has is read old trees of any size have become scarce in a wild state, seedlings being still plentiful but it is

P 196, l 8, for ‘ (?) ’ read “ reaching 50 to 60 feet in height ” and line 29, add —

“ The timber is heavy and is used in house building (*Ridley*)

P 237, l 1, after “ 144 ” insert “ , Brand Monog Sympl 40

P 254, l 21, for “ 7348 ” read “ 7848

P 257, last line but two add — “ Remarkable among Jasmines for having white instead of black fruit (*Ridley*)

P 272, l 14, to note add —

“ *Ridley* says this is *Linociera lanceifolia* Ridley in Journ Str Br R As Soc No 89, 14 (1903)

# PART No 18 (1905)

Page 280, line 14, after “ sessile ” insert “ , white,

P 284, after line 12, insert note —

‘ *Ridley* says that he found *Ehretia burifolia* Roxb Cor Pl I 42 t 57 along the Rumpin River in Pahang. We have seen no specimens

Page 292, line 19, after "*Flowers*" insert "white,

P 295, l 4, after "*Wray* 2580!" put "," instead of "." and for "*MALACCA Bujong*" read "*Bujong Malacca*,"

P 335, l 13, add — "*Common on the sea-shore (Ridley)*" and to the note after "*species*" add —

"Ridley writes that *Solanum mammosum*, Linn Sp Pl 187 should be added as it is thoroughly established and a conspicuous feature of the scenery on waste ground in Selangor and Perak. It is also common in old tin mines. No specimens have been seen."

P 339, l 9, for "*C*" read "*P*"

P 340, l 15, to note add —

"Ridley says the purple flowered variety is by far the commonest, but is not wild and is found on waste ground only."

P 340, last line but 2, for "*all*" read "*some of*" and after "*provinces*" insert "*sparingly*,"

P 348, l 20, delete "*Herpestris pygmæa*, Griff Notul IV 104"

P 348, l 25, after "*Flowers*" insert "*violet with white throat*,"

P 350, l 8, for "*SPSSIFLORA*," read "*SESSILIFLORA*,"

P 352, l 4 from below, omit "*white or white and pink*" and after "*exserted*" add "*, tube and back of upper lip cherry red, lower lip white with a yellow central spot, stigmas yellow (Ridley)*"

P 354, l 3, for "*ASIATICA*, Linn Sp Pl 619" read "*ATROPURPUREA Ridley n sp*"

P 354, lines 12 to 17, omit all the references

P ,, ,, 19, 20, omit "*DISTRIB &c to end*"

P ,, line 21, for "*BENTHAMIANA* 226" read "*CÆLESTIS, Ridley n sp*"

P 354, lines 29 to 31, omit all the references

P ,, line 22, omit "*DISTRIB &c*"

P 355, at the end of the genus *TORENIA* add note —

"Ridley says that *T. Benthamiana*, Hance, is often cultivated but is not established. He also says that *T. mucronulata*, Benth. in DC. Prodr X 409 should be added with the following localities: PENANG Waterfall and Government Hill, Curtis, 1837. TRENGGANU Bundi, Rostado. DINDINGS Gunong Tungul, Ridley 9444. PAHANG at Tahan River, Ridley SINGAPORE Garden jungle, Bukit Timah, Ridley 6894."

P 357, l 8, after "*Corolla*" insert "*light blue*,"

#### PART No 19 (1907).

Page 399, lines 23, 24, for .—

"But the author gives no explanation of his drawings," insert "and the author uses the term '*funiculus umbilicalis*.'"

P 469, line 16, at the end change " ' to " , " and in line 17 omit "*S. caudatus*,"

P 470, l 15, for " 193 " read " 192 "

P 532, l 7 from below, for " SELANGORICA, King & Gamble, n sp ' substitute " CARNOSUM, Merrill & Rolfe in Philipp Journ Sc III (1908) 121 "

P 533, l 9, after " all add " *Oxystelma carnosum*, R Br Prodr Fl Nov Holl 462, Dene in DC Prodr VIII 543 *Cynanchum carnosum*, Schltr in Perkins Fragm Fl Philipp 120, *Vincetoxicum carnosum*, Benth Fl Austral IV (1869) 331

Page 533, l 11 at end, add " Australia

P 543, l 17, for " Patch read " Patch

P 546, l 12, for " Hort Ham read " Herb Buch -Ham '

P " , 4 from below, for " Tjuk read " Ijuk "

P 549, at end of PERGULARIA insert note —

" According to N E Brown (Kew Bull 323 (1907)) the generic name Pergularia really belongs to *Dennu* and (This Dyer II Cap IV 1 775) the species described under *Pergularia* must be renamed under *Теломма*, Coville '

P 554, line 19, omit " MALACCA Griffiths 3764 '

P 574, l 12, after " rounded insert ' or cuneate

P 579, lines 6 to 10, for " Wall Cat t 4545 read " Lindl Bot Reg (1847) t 51 Hook Bot Mag t 4545, Wall Cat 8171, Dene in DC Prodr VIII 633, Miq Fl Ind Bat II 513

P 586, after line 7, insert note —

" For a discussion of the curious modifications of the leaves of *D. Rafflesiina*, *D. compler* and other species, see the following Treub in Ann Bot III 13, Scott & Sargent in Ann Bot VII 243, This Dyer in Ann Bot XVI 365, H H W Pearson in Journ Linn Soc XXXV 376 '

# PART No 20 (1907).

Page 637, line 10 from below, for " T Anders ' read " Wall "

P 641, l 7, for " E " read " S

P 646, lines 12, 13, omit " *H. phlomoides* and transfer " Miq Fl Ind Bat II 779, ' to after " DC Prodr XI 90, '

P 683, line 17, for " Wall ' read " Nees "

P 700, last line of analysis, omit " 18 CYMARIA and insert

" Anthers 2 celled, upper lip of corolla merely notched	.. 18	CYMARIA
Anthers 1 celled, upper lip of corolla 2 lobed	19	ACHYMIA "

P 701, line 4 from below, after " places insert " PENANG Deschamps PROVINCE WELLESLEY Ridley 7168 SELANGOR at Kwala Lumpur, Ridley 10204 SINGAPORE Hullett 63, 175



ANDAMANS at Port Blair, *Kurz, King, Prain* NICOBARS Car Nicobar Moos, *King's Collectors*, Katchall, *Kurz* "

P 702, l 19, for "PERAK MALACCA" insert "PENANG *Wallich* 2713 E, at Santong Sotong, *Curtis* 2492 DINDINGS at Pangkore (marked ' introduced) *Scortechini* 1017 ANDAMANS S Andaman, *King*

P 702, lines 27 and 30, for "graveolens" read "suaveolens"

P 704, line 4, for "PERAK *Kunstler*" insert "KEDAH Langkawi, on the small islands, *Curtis* 2577 PERAK near Bernani River at 300 to 400 ft, *Kunstler* 8813 "

P 705, l 10 from below, at end, insert "SINGAPORE *Kunstler* 89 "

P 707, after "Provinces" insert "PENANG *King, Deschamps* PERAK at Jenah, 200 to 300 ft, *Wray* 1759 MALACCA *Griffith* 3957 SINGAPORE *Wallach* 2733, *Schomburgk* "

P 708, lines 19 and 20, for "SINGAPORE 7603!" read "PERAK Upper Perak, *Wray* 4046, Rawang, *Ridley* 7603 PAHANG Tahan River, *Ridley* 2131! MALACCA *Griffith* 3966! SINGAPORE *Gr Thomson*, Bukit Panjang *Ridley* 3951, Gunong Bintang, *Kunstler* 255, and at line 22, after "cultivation," add "Sumatra (in Eastern Sumatra, *T Daud* Herb *Ridley* 11336, at Kitta Djawai in open and sunny waste places in Lampongs, *Forbes* 1416a) "

P 709, line 9, after "Wray" insert "1682"

P 710, l 28, for "In all the provinces" read "KEDAH Langkawi *Curtis* PENANG Bahok Polo Road, *Curtis* 868, *Deschamps* PERAK *Scortechini* PAHANG Katapong, *Ridley* 1286 MALACCA *Hervey Griffith* JOHORE Kwala Kanary, *Lake & Kelsall* 4028 SINGAPORE *Kunstler* 128, *Hullett* 19 *T Anderson* 148 NICOBARS Kamorta, *Kurz*, Car Nicobar, *King's Collectors* "

P 710, after line 28, at end of *DYSOPHYLLA* insert the following —

2 *DYSOPHYLLA VERTICILLATA*, Benth in Wall Cat 1544 (1828) An annual herb Stems laxly branched, rarely simple, 6 in to 3 ft high, glabrous or nearly so Leaves in whorls of 4-10, glabrous, linear, subacute, margin entire or obscurely toothed, 1-3 in long, 15 to 25 in wide, petiole short or 0 Flowers in villous or tomentose cylindrical terminal spikes, 1-2 in long, 2 in in diam, whorls of cymes close-set throughout Calyx in fruit 0.8 in long, campanulate, teeth subequal, triangular, stellately spreading. Corolla 0.8 in long, pinkish, tube slender, hardly exerted, lobes pubescent Filaments exerted, hairy. Nutlets ellipsoid Benth in Wall Pl As Rar I 30, in Lab Gen & Sp 159, and in DC Prodr XII 157, Thw Enum Pl Zeyl 239 (in part), Hook Fl Br Ind IV 639 *D ramosissima*, Benth in Wall

Cat. 1543 *D. Benthamiana*, Hance in Ann Sc Nat Ser 5, V 234. *Mentha stellata*, Lour Fl Cochinchin 36 *M verticillata*, Roxb Hort Beng 44, and in Fl Ind III 5 *Pogostemon verticillatus*, Miq Fl Ind Bat II 965

KEDAH Langkawi, Coah, Curtis 2098! DISTRIB —Throughout South Eastern Asia, and in Australia

Page 714, line 15, for "PERAK *Scortechini*" read "KEDAH Kedah Peak, Ridley or Curtis PERAK Harans, *Scortechini* 788!"

P 715, l 6 from below, for "In all the provinces" read "SELANGOR Ridley 7601 ANDAMANS S Andaman, King's Collector NICOBARS Nancowry, King's Collector"

P 717, l 26, after "escape" add "MALACCA Bukit Bruang, Hervey"

P 719 l 10 from below, after "Deschamps" add ", Hullett 9 PENANG Deschamps PROVINCE WILLESLEY G King PERAK Thaipeng, *Scortechini* 7, 482 Telukanson, Ridley 10769," and after "Griffith" insert "ANDAMANS S Andaman, King's Collector"

P 720, l 23, after "1115" insert "at Tanjong Joking, Curtis 2491, Deschamps PROVINCE WILLESLEY Butterworth, G King MALACCA G King", and line 24, after "48" insert "Hullett 9"

P 721, l 14, after "places" insert "SELANGOR Pudok, Goodenough 10462 PAHANG at Pekan, Ridley 1164"

P 722, l 17, after "7095" insert "Larut at 500 to 1000 ft, King's Collector 2372"

P 724, l 18, after "Wray" insert "Goping Kun i'er 467"

P 725, l 24, at beginning, insert "PAHANG at Pulau Tawai, Ridley 2148, also at Kuala Tanbeling," and lines 26 to 31, omit "It has *Materials*" and add "Ridley has also collected in Johore at Bukit Saga (No 11130) a plant, also with white flowers, which agrees with *G oblongum* in every character except in having calyx-teeth much shorter than the tube"

P 726, l 3, after "1310" insert "gathered in Botanic Garden, from a plant sent from Waterloo, Perak, Curtis 2166"

P 727, after line 4, the end of LABIATÆ, insert the following —

19 ACRYMIA, Prain in Kew Bull for 1908, 114 (1908)

Undershrubs *Flowers* small, in lax, many-flowered, peduncled, raceme-like, axillary cymes *Calyx* erect, 10-nerved, the intermediate nerves weaker than the other 5, equally 5-toothed, the tube in fruit urceolate, throat within naked *Corolla-tube* slightly enlarged upwards, shortly exserted, limb 2-lipped, lower lip 3-lobed, spreading, the mid-lobe larger than the lateral, upper lip suberect, 2-fid, not arched

*Stamens* 4, exserted, didynamous, the upper pair shorter; anthers 1-celled *Disk* small, equal, entire. *Style-arms* unequal, the upper very short *Nutlets* obovoid, rugosely pitted, hilum very large, lateral—*DISTRIB.* Species 1, endemic

The genus *ACRYMIA* is closely allied to *Cymaria*, with which it agrees as regards inflorescence and fruit, but from which it differs in having a 2-lobed upper lip that does not conceal the 1-celled anthers. Though much smaller, the corolla of *Acrymia* resembles rather closely the corolla of *Ajuga*, a genus in which the anther-cells, though usually discrete, are sometimes at length confluent. In habit, however, *Acrymia* is unlike either of the genera to which it is so closely allied, and recalls that met with in an Indian group of species belonging to the genus *Gomphostemma*, which includes *G. ovatum*, Wall., and *G. Mastersii*, Benth.

*ACRYMIA AJUGIFLORA*, Prain in Kew Bull. 115 (1908). A dwarf undershrub *Stems* woody, prostrate and rooting below, 2-3 in. long, densely leafy above *Leaves* opposite, petioled, elliptic, obtuse, crenate except the sometimes unequally cuneate, or occasionally subtruncate base, dark green above, paler beneath, fulvous-strigose on both sides, especially along the 5-7 pairs of main nerves and the secondary reticulate veins, 4.5-8 in. long, 2-3.5 in. wide, petiole 75-2 in. long, fulvous-strigose. *Cymes* dichotomously branching, with terminal flowers, flowers on the branches secundly arranged, main-peduncles strigose, slender, 75-125 in. long, bracteoles subulate, shorter than pedicels. *Calyx* in flower campanulate, .08 in. long, in fruit urceolate, .15 in. long, strigose on the nerves externally, teeth 5, equal triangular as long as the portion of tube above the constriction, pedicels slender, strigose, .07-.1 in. long. *Corolla* white, .25 in. long, glabrous, tube shortly exserted; lower lip spreading, 3-lobed, mid-lobe obovate, upper lip suberect, 2-lobed, lobes oblong, hardly exceeding lateral lobes of lower lip. *Filaments* exserted, hirsute at base, glabrous elsewhere, anthers 1-celled. *Nutlets* obovoid, .02 in. long, wide-reticulate, at first sparsely pubescent, at length glabrescent.

**PERAK:** On limestone rocks, in dense jungle, 500-800 ft., *Kunstler (King's Collector)* 10709!

#### PART No. 21 (1908)

795, l. 8, for "SPHENODESMA." insert "SPHENODESME."

**NOTE.**—Since the completion of the Families of the Gamopetalæ, a paper has been read before the Linnean Society by Mr. H. N. Ridley, F.R.S., on a "Collection of Plants made by Messrs. H. C. Robinson and L. Wray on Gunong Tahan, Pahang." It describes a number of new species, and should be consulted by all workers who may make use of the 'Materials for the Flora of the Malay Peninsula.' It was published in Linn. Soc. Journ. Bot. XXXVIII. 301 *et seq.* (1908).

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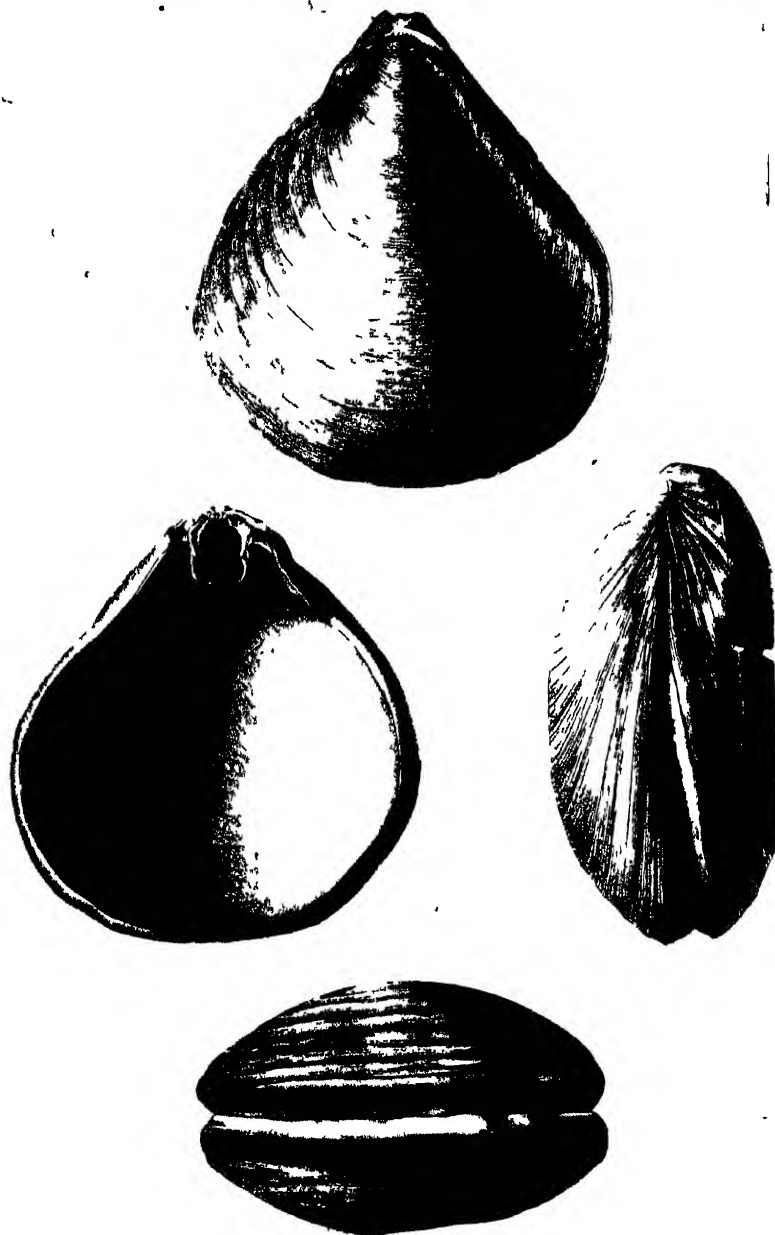
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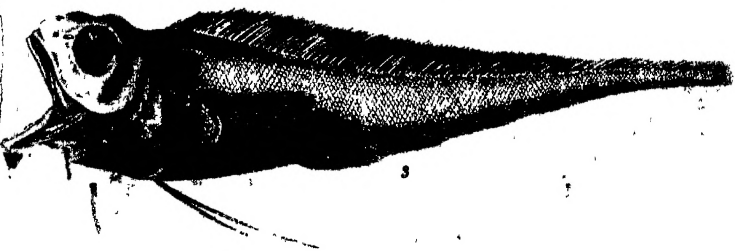
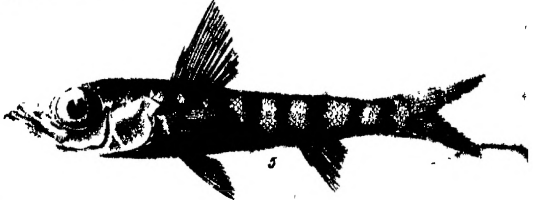
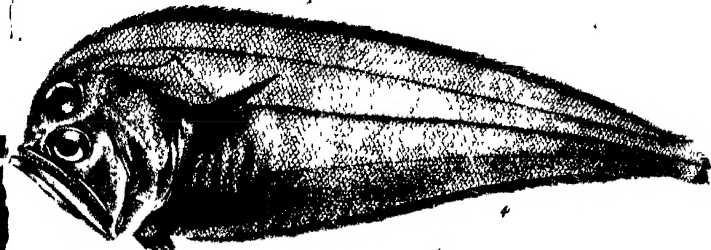
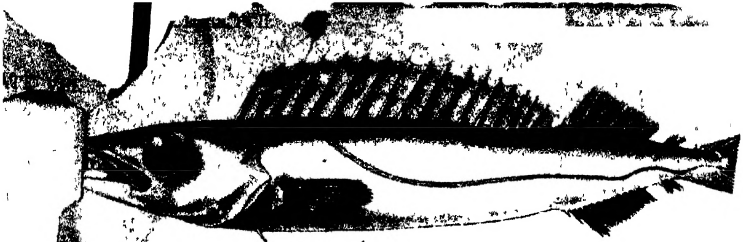












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*Curtisii*, King & Gamble 521  
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**TRACHELOSPERMUM** Lemaire 497  
Curtisii, King &  
Gamble 498  
*Teisteria assamica*, Griff. 359  
*cordata*, Griff. 354  
*Trichosporum radicans*, Nees 786  
**TRIDAX** Linn. 45  
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